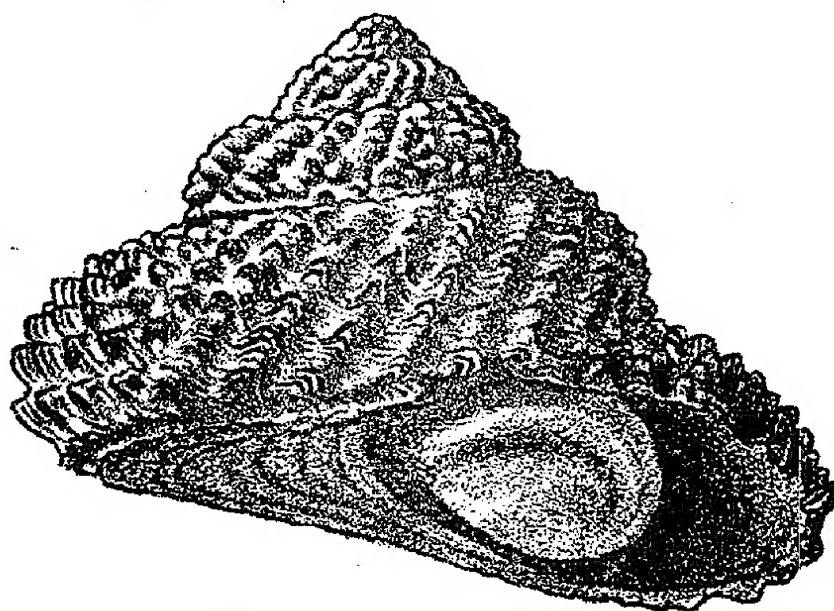


COOKIA



Journal of the Wellington Shell Club

New Zealand

Vol 1,

No 2

WE ARE GROWN UP

TWENTY ONE YEARS OF THE WELLINGTON SHELL CLUB

by W. J. PAUL

Credit for the idea of having a club for shell collectors in Wellington must go to Dr R.K. Dell, Director of the National Museum. In several discussions about shells which I had with him, the conversation turned to the possibility of bringing together the few collectors we knew of in this district. He sent out an invitation to several local enthusiasts to meet at the Dominion Museum (now the National Museum) in the evening of Thursday 26th May 1955 to discuss the formation of a club. Seven people accepted his invitation.

Dr Dell set out his proposal, and it took only a brief discussion to find general agreement on his idea. A few formal decisions were made - that the group be called "The Wellington Shell Club" - that no officers were really necessary at that stage - that Dr Dell would chair meetings - and that I would perform any secretarial duties.

The Director of the Museum (Dr R.A. Falla) informed the group that to help to get it established the Museum would meet any expenses during its first year. Hence no subscription from members was called for.

The eight "foundation members", as we may call them, were:- Dr R. K. Dell, Mr L. H. Hosking (now of Auckland), Mr R.V. Roberts (now of Auckland), Dr W.F. Ponder (now of Sydney), Mr J. Gibb (now of England), Mr W. K. Hounsell, Mrs J. Swinbourn, and Mr W. J. Paul. (Regretably I have been unable to ascertain recent information regarding Mrs Swinbourn or Mr Hounsell).

The name of the club has remained the same these twenty one years, although in December 1956 an attempt was made by some members to change it to "Wellington Conchology Club".

Over these years, too, we have stayed by the decision of the original group to hold meetings on the fourth Thursday of each month, except for some special occasions to accommodate speakers.

Meetings during 1955 consisted entirely of talks on various aspects of shells and shell collecting by Dr Dell. The year 1956 however, saw quite a broadening of activities. In March we held our first field trip - a land snail collecting outing to Keith George Memorial Park, near Silverstream. Member participation in meetings was developed and we had two guest speakers - Dr C. A. Fleming and Dr J. Marwick. The club was getting well on its way, and at the end of the year a more formal meeting was called to set up a management. A Committee of three was elected. This original committee consisted of Messrs L. H. Hosking, S. Hulme and W. J. Paul, with Dr Dell as a member ex-officio.

From this stage onwards the pattern of club activities has remained much the same. Meetings have consisted of - a period for formal business - a study group of a selected Family or Genus of Molluscs - a lecture, or the showing of films, or shell displays - concluding with a cup of tea over which members informally discussed all manner of subject, but mostly shells. At many meetings a short period has been devoted to identification by our experts of "problem" specimens brought by members.

By 1958 attendances at meetings were averaging between fifteen and twenty and it became apparent that some serious projects could be undertaken. Our first effort was to endeavour to compile a list of shells collected on the west coast beaches from Paekakariki to Foxton. This was prepared by checking existing literature and obtaining from members lists of the species in their collections. Circular No. 8 of June 1959, listing 207 species was the outcome of this exercise. A revised list was published as Bulletin No. 17 in 1969.

This initial achievement set the ball rolling for the publication of the several locality lists which have been prepared and which together provide collectors with an overall picture of the molluscan fauna of the southern portion of the North Island (the individual lists are of - Wellington Harbour, West Coast Beaches, Porirua Harbour, Kapiti Island, and a separate list of fossil shells collected on the West Coast beaches). Unrelated to these lists, but of considerable value to collectors, was the list provided to the club by Dr Climo of the shells collected by the National Museum Expedition to Port Pegasus, Stewart Island in February and March 1972 and published as our Bulletin No. 30.

While the great majority of our monthly meetings have been held at the Museum a number have taken place away from that institution. Several members have kindly made their homes available for meetings and those present have enjoyed seeing their fellow-members' collections. The Geological Survey has been the venue on a number of occasions as has also the Oceanographic Institute and Victoria University Zoology Departments' Marine laboratory at Island Bay. Members of the staffs of these organisations have been most helpful in demonstrating to our members the nature of their work and in displaying their collections.

Members of clubs and societies like to mark the passing of the years by convening social occasions for outstanding birthdays, and we have fallen victim to this urge. On the club attaining five years of age, our birthday coincided with a visit to the Geological Survey. A little more than our usual supper of tea and biscuits was provided and after inspecting some of the current work of the survey a social gathering concluded the evening. Again, we could not let our tenth birthday pass unnoticed. On that occasion, May 1965, members were invited to the home of Dr and Mrs G. Matheson. Members and wives had an enjoyable informal evening seeing the hosts' shell collection, and partaking of a supper provided by the ladies. Mrs Paul made a birthday cake which was iced and decorated with some small shells. I hurry to add that the shells were well cleaned before use.

Like most societies we have had some poor periods as well as good. The year 1964, for no reason we could specially pin-point, was one of the former. Attendances fell to a low level, and some of us had thoughts of possibly having to close down. A few new ideas were thought up to enliven the scene, among them being the talking of the Wellington Central Library into putting a display of shells and shell books in one of the large glass show cases by the front door. A special meeting held that year reorganized the club, and once again we found ourselves a viable organization.

Through 1965 and 1966 membership increased and since then we have not looked back. We were getting eighteen to twenty fairly regularly at meetings.

In 1967 it became apparent that a more formal organization was desirable, particularly as Dr Dell's involvement in the management of the Museum precluded him devoting as much time to the club as in the past. It was decided that the Committee should now consist of a President, Secretary, Editor and Librarian. I was elected to the position of President, and held office until replaced by Mr P. Cresswell in 1974. In 1973 a further innovation in management occurred by the creation of the position of Vice-President, to which Mr P. Cresswell was elected.

An outstanding event in 1970 was a public display of shells and shell books in the window of J.F. Gordon & Co's sports goods shop in Cuba Street. Several members contributed material and Mr D. Cowe prepared some background display boards. This exhibition attracted a lot of attention from shoppers, and a supply of leaflets was provided for people to take, setting out the purposes and activities of the club.

In 1974 a new feature of club meetings was the setting up of an "exchange table". Several members donated shells which were listed in a book prepared for the purpose. The shells were displayed on a table and members were entitled to take items they wanted and replace them with items of their own, the book acting as a record of all items taken and lodged. There has been a considerable traffic in this exchange system which seems to work well and provides for a wider scope in obtaining interesting items than by direct exchange between members.

Today we have a very healthy organisation with over 60 members - mostly in New Zealand, but with a few scattered far and wide, in Australia, Belgium, England and the Solomon Islands.

CLUB PUBLICATIONS

It was realised early that to achieve any real purpose it would be necessary to have some form of written communication from the management to members, particularly to any we may get from out of Wellington who would not be regularly attending meetings.

It was decided to issue information in the form of circulars. Circular No. 1 was issued in December 1956 and gave a brief account of the club's activities to that date, together with a few comments on our finance and possible projects. This form of communication carried on till Circular No. 21 was issued in 1965. The two most important of these were No. 8, which has already been mentioned, listing shells collected on the west coast beaches, and No. 12 which listed shells collected in Wellington Harbour.

In 1966 the format of our publication was modified and a change was made by using the title of Bulletin. No. 1 was issued that year, and these continued to No. 36 in 1975. The bulletins, as distinct from the circulars, have consisted basically of articles on shells and shell collecting provided by members.

We have now launched further into the publication field with the issue in 1976 of "Cookia - The Journal of the Wellington Shell Club" Vol.1 No. 1 - a 30 page magazine.

Since Dr F. M. Climo joined the staff of the National Museum his notes of study groups have been stencilled and made available to members. These have proved of great value for reference purposes, particularly as in many families they provide taxonomic data developed since the publication of "Shells of New Zealand" by Dr A.W.B. Powell in 1962. Notes of several study groups conducted by Dr A.G. Beu have been similarly circulated to members. In all, 21 circulars, 36 bulletins and 30 sets of study-group notes have been issued. A record of which the club can well be proud. Our publications are exchanged with five overseas shell collectors' clubs.

CLUB FIELD TRIPS

Although we have not had these with any regularity, members have had a variety of outings together. These commenced with the trip already mentioned in 1956 to the Keith George Memorial Park. Over the years however a number of other places have been visited - some of them on several occasions.

Venues of such outings have been:-

- Island Bay
- Breaker Bay
- Pukerua Bay
- Wanganui fossil localities (week-end trips)
- Dredging in Wellington Harbour
- Dredging in Marlborough Sounds
- Castlepoint
- Peka Peka Beach

These collecting trips have greatly enhanced members' collections.

CLUB LIBRARY

The library was initiated by the donation from the Museum of several volumes and reprints of scientific papers. Several members contributed spare books and copies of printed papers. Circular No. 18 in 1963 consisted of a list of the contents of the library, then over 70 items, and advised members that the books and papers listed could be borrowed at meetings. The library is now housed in a steel cabinet at our meeting place in the Museum. The reorganization of the material and improvement of the collection is currently under way.

OFFICE BEARERS

The following is a list of Presidential, Vice-Presidential and Secretarial office bearers:-

Presidents (office created 1967)

- Mr W. J. Paul 1967 - 1974
- Mr P. Cresswell 1974 -

Vice-Presidents (office created 1973)

- Mr P. Cresswell 1973 - 1974
- Dr F. M. Climo 1974 -

Secretaries

- Mr W. J. Paul 1955 - 1965
- Mrs E. Jamieson 1965 - 1967
- Mrs E. Matheson 1967 - 1968
- Miss R. Adams 1968 - 1972
- Mrs J. Beu 1972 - 1973
- Mrs C. S. Wood 1973 - 1975
- Mr J. O. Marston 1975 -

SEPARATING OUT SMALL LAND SHELLS

D. J. Roscoe

This country has an unusually diverse selection of small non-marine molluscs. Each tiny area where anything of the original habitat survives has a different selection of tiny shells, often from dozens of species.

Searching for these at the spot where they occur has many advantages. You can observe the exact microhabitat; in poorer collecting areas such as beech forest you can search for the only habitats; if you want to find a particular species alive to dissect, you can concentrate on that. However, this type of collecting takes time and is difficult, especially during rain or in poor light conditions, so many of us also take a quantity of leaf mould or limestone ledge-litter. Samples of this type usually contain large numbers of small shells, often several hundred per pound of litter, or as many as several thousand per pound in the richest areas (some offshore islands, for example). These large numbers of shells give a more accurate idea of shell variation and rarity, but the problem is to sort them from the debris, given limited time. I have found that the following method lets me sort large quantities of leaf mould quickly and thoroughly.

First catch your leaf mould. I prefer to take samples from where I have just visually collected a shell; for every one you see, there may be ten you don't see.

To start sorting, place a fistful of the litter in a large kitchen sieve resting on a bucket, and run water through the sieve, shaking it so the water flows through more easily. Larger sticks, stones and leaves can be discarded, washing them as you remove them. When the bucket is full, empty it out, as it should contain nothing much larger than juveniles of the smallest shells. Upend the sieve into a smaller container (about $\frac{1}{2}$ gallon), washing in the last bits, and fill to near the top with water. Stir lightly and pick the shells off the top with a mapping pen; stir vigorously at intervals while looking for shells. Remove the floating debris by hooking your fingers under it, and put in the next lot of washed material.

The residue at the bottom of the smaller container often includes several live or damaged shells, and can be sorted through on a flat dish, or dried and the shells floated off later.

This method has proved efficient in use, and is good for extracting the small shells with spikes and plates, which are often completely covered in mud.

The shells should be sorted without too great delay when they are floating or wet; after about $\frac{1}{2}$ - 1 day they become waterlogged and start to sink, and must be dried and re-floated.

SHELL COLLECTING AND THE NEW LAWS

J. R. McKinlay
NZ Historic Places Trust

Middens are the result of the selective gathering from the natural environment of items which were of significance for various economic, industrial or subsistence reasons to the people who inhabited the area in times past. The middens themselves consist largely of the discards of this collecting, which have survived the physical, biological and chemical weathering of the years which have passed since their original deposition. This twice-biassed collection of material has much to tell about past lifeways, and of the interaction between man and his environment. As such, middens are a very important part of the wide spectrum of evidence with which the archaeologist and the prehistorian work.

I have noted with interest a recent article in 'Cookia' (Andrews, Vol 1, No. 1, p.2) in which the shell content of 6 Maori middens in the Castlepoint area have been tabulated as a comparative species list, and commented upon. Such tabulations are of interest to conchologists and other natural scientists, but they are also of interest and value to archaeologists whose special interests lie in the investigation of the activities of man in the past, and especially in his exploitation of, and impact upon, the natural environment. There are obviously many areas of intellectual enquiry which are of mutual interest to archaeologists and conchologists, and I would hope that there will always be an opportunity for co-operation and the exchange of information between the two groups of workers.

However, the article in question did cause some minor stirrings of unease, particularly in relation to the implications and effects of two recently-operative laws - the Antiquities Act 1975 and the Historic Places Amendment Act 1975. First, Andrews notes that she found 'oven stones, bird bones and cutting tools of obsidian and flint'. Some of these items, as artefacts, are directly affected by the Antiquities Act. They are deemed the property of the Crown, and should be reported to the Department of Internal Affairs within 28 days of their being found. The Secretary is empowered to determine where they are to be held. In addition, they may not be removed from New Zealand without the permission of the Secretary for Internal Affairs. Incidentally, the Act similarly controls the export of scientific type specimens, which would include type specimens of shells.

Secondly, under the Historic Places Act, all such middens are considered to be archaeological sites, and it is an offence to 'destroy, damage or modify' such places without the permission of the Historic Places Trust.

I quite appreciate that in the case of surface collecting for shells there is no damage or destruction of the site, and that any 'modification' by the removal of a small part of the midden content is minimal. But I do think it necessary for all shell collectors to realise that they must not actually dig into a midden to obtain shells.

I would like to stress that I do not intend to imply that the collecting which gave rise to the article in 'Cookia' was any other than acceptable surface collecting, which has resulted in the publication of some interesting data.

There are many examples which could be noted of the profitable interplay of the studies of conchologists and archaeologists. I will briefly mention two.

For some years archaeologists from the University of Auckland have been carrying out studies of the prehistoric occupation of the Coromandel Peninsula. The problems being investigated have in general been seen in terms of storepits, house structures and portable artefacts, and although faunal materials have not been ignored, they have not always been made to yield up their full quota of information.

But certain results have been achieved, among which is the belief on the basis of midden materials, that the earliest Polynesians in the area, being familiar with the faunal communities of the coral reefs of tropical Polynesia, on their arrival in New Zealand first exploited the similar rocky shore communities. Their discovery and exploitation of the sandy shore shellfish appears to have followed only after a discernable lapse of time. It is also of interest to note that the only artefact yet found in a prehistoric context in New Zealand, which had definitely derived directly from tropical Polynesia, was a piece of a fish-hook, found on the Coromandel coast at Tairua, which had been fabricated from pearl shell.

More recently, a graduate archaeology student in Auckland, when reworking midden samples retained from the earlier Coromandel excavations noted that among the rocky shore univalves there was a species not known to be present in the area today - the limpet Cellana denticulata. Further analysis revealed that this limpet when present in stratified sites, invariably occurred in the lower levels, or was present in the lower levels in greater numbers of greater size than in the later levels. Furthermore, where present in unstratified deposits they were more usually in sites which gave early Radio Carbon 14 dates. It appears that at the time of the earliest Maori arrivals there existed in certain parts of the Coromandel coast (and probably the longer North Auckland coast) a minor population of c. denticulata which had in some way migrated northwards from the more normal Cook Strait habitat. This population was immediately exploited - to extinction. Hence, it is argued the c. denticulata horizon may serve as a very clear temporal marker for sites on the Coromandel coast. For fuller details reference should be made to the principal publication (Rowland, M. 1976: Cellana denticulata in middens of the Coromandel Coast - New Zealand possibilities for a temporal marker, Journal of the Royal Society of New Zealand, Vol. 6, No. 1: 1-15)

It has not been the intention of this note to exclude the serious shell collector entirely from any consideration of the shell content of Maori middens. Rather it was intended to indicate that shell middens and their contents are now protected by new legislation, and that all persons who wish to examine them should do so in the knowledge of and due caution for the law.

It should also be noted that middens may be parts of sites which are of real importance to the Maori people, and this too should be recognized, particularly if human bones or artefacts can be seen on the midden.

There are many areas in which the interests and studies of the natural scientist and the archaeologist overlap, and I hope that the common interest in shells, and the co-operation which has existed in the past, can be continued.

THE SMALL TROPHONS OF NEW ZEALAND PREVIOUSLY CLASSIFIED IN THE
GENERA Zeatrophon, Xymene, Axymene and Xymenella

F. M. Climo

INTRODUCTION: Trophons represent the conchologically less-striking end of the family Muricidae, where members are small, not usually elaborately sculptured and usually unicoloured. 20 species and subspecies are recorded in Powell's (1957:102) checklist of New Zealand shells classified in the above (title) four genera. These genera and species have been reviewed by Ponder (1972:471-99), and a summary of Ponder's review is presented here.

Finlay (1927) divided N.Z. trophons into 2 main groups:
forms with a multispiral protoconch
forms with a paucispiral protoconch

This division looks clear enough when viewed by itself but when other characters are examined the classification becomes artificial if based on protoconch alone. A multispiral protoconch is usually associated with a planktonic larval stage; the paucispiral type usually indicates direct development. Ponder (1972:473-74) pointed out that there is really little difference between the two types because environmental stresses could produce either type quite quickly. Thus the paucispiral type has probably arisen several times from a stock having the more primitive multispiral protoconch - in other words, both types of protoconch are found in quite closely related species. This is supported by similarity of radula and teleoconch morphology between species having both types of protoconch.

SYSTEMATICS:

Because the shell differences are independent of protoconch differences and the paucispiral protoconch has developed several times in New Zealand, Ponder synonymised the four generic names in the title and used for this one genus the earliest of the four names Xymene Iredale, 1915.

The common name trophon is the non-formal use of the genus Trophon, Mountfort, 1810. Trophon is closely related to Xymene. With the exception of the subantarctic species and an unnamed species occurring in deep water around New Zealand, all New Zealand species of trophons belong in Xymene. Trophon differs from Xymene in being larger, with a large paucispiral protoconch, lamellose axial ribs and weak spirals, rarely with labial ornament, and with a short straight siphonal canal.

Thus, at this point the synonymy reads:

Genus Xymene Iredale, 1915
Synonyms Axymene Finlay, 1927
Zeatrophon Finlay, 1927
Xymenella Finlay, 1927

The New Zealand complex of species can be regarded as subgenerically distinct from a group classified in Xymenopsis Powell, 1951 in subantarctic South America. All the New Zealand trophons are classified in genus Xymene subgenus Xymene. Within this New Zealand subgenus 4 groups can be conveniently recognized:

1. Protoconch rather depressed, smooth; teleoconch with subequal spirals and axials predominant; shell small (includes species assigned to Xymene and Xymenella)
2. Protoconch elongate, last whorl often keeled; spiral sculpture slightly weaker or stronger than axial lamellae; shell small or large (includes mostly species assigned to Zeatrophon)

3. Protoconch large, tall, with last 3 whorls keeled or angled; teleoconch with thin lamellae, shell small (one new species & one previously assigned to Xymenella) FOSSIL ONLY.
4. Species previously placed in Axymene and distinguished by their paucispiral protoconchs.

NB The contradiction between Ponder's group 4 on p. 475 and that which is defined above on p. 494. The earlier citation refers to the South American Xymenopsis, not applicable to the N.Z. situation. This layout mistake in the paper may cause confusion if not pointed out).

Genus Xymene Finlay, 1927
Type species Fusus plebeius Hutton, 1873
Subgenus Xymene s.s.

GROUP 1

Characterized by depressed multispiral protoconch and subequal spiral and axial sculpture.

Xymene (Xymene) plebeius (Hutton, 1873)

Split into 3 chronosubspecies, plebeius, expansus and moniliferus, the two latter fossils.

Xymene (Xymene) plebeius plebeius (Hutton, 1873)

Synonym: Xymene inferus (Hutton, 1873)

The common intertidal and sublittoral species found in harbours and estuaries throughout N.Z. The name inferus had been applied to large worn specimens from Stewart Island.

Xymene (Xymene) gouldi (Cossmann, 1903)

Synonym: Xymenella pusilla (Suter, 1907) (See Ponder, 1972: 478-79, for quite a complicated synonymic situation not listed or explained here)

"This species differs from other members of the genus by its evenly convex, or very weakly shouldered whorls, elongate spire and depressed protoconch. The only other late Tertiary to Recent species having this type of protoconch is X. plebeius" (Ponder: 479).

Stewart Id, E. coast of both main islands to North Cape. Normally found in less than 30 faths. Occasionally found alive in the lower intertidal - preferring rocky shores bordering channels in which there is considerable water flow. Most living specimens dredged in such channels.

GROUP 2

"This group mostly includes species previously referred to Zeatrophon. The type species of Zeatrophon (Fusus ambiguus) is larger than other species and superficially resembles some species of Trophon" (Ponder: 484).

Xymene (Xymene) ambiguus (Philippi, 1844)

Distributed throughout N.Z. from low tide to about 50 faths.

Often occurring in 2 forms, one smoothish and broad, the other with a raised clathrate bladed sculpture. This difference is not entirely sexual according to Ponder (486) who stated that narrow shelled females are occasionally found.

Xymene (Xymene) pulcherrimus (Finlay, 1930)

Up to 15-20 mm height. "Differs from mortenseni caudatinus, with which it sometimes occurs, by its smooth protoconch, more widely spaced, narrower axial ribs, and in the upper spiral of the two main spirals being the stronger as in (Fossil) bonnetti (Ponder:489).

Found off the Otago coast, Chatham Is and Cook Strait in 60-260 faths.

Xymene (Xymene) mortenseni (Odhnner, 1924)

"....characterized by its tall spire, strong, rounded axial ribs and dense axial foliation. The protoconch has a keel on the last whorl. There are two main spirals on the spire whorls which are subequal in some specimens, but in most specimens the lower one is the stronger" (Ponder: 489).

Ponder recognized two subspecies:

Xymene (Xymene) mortenseni mortenseni (Odhnner, 1924)

12-15mm height. Small form occurring at the Auckland Islands.

Xymene (Xymene) mortenseni caudatinus (Finlay, 1930)

Over 25mm in height. Rest of N.Z. from Stewart Id North, and Chathams, in 10-110 faths.

Xymene (Xymene) warreni Ponder, 1972

Height 20.1mm. "Similar to ambiguus and has the uppermost spiral cord of the spire whorls weaker than the lower one as in that species. It is smaller, however, and with more numerous regular spiral cords and very weak axials. It is probably derived from lassus from which it differs in the prominent spiral sculpture. The radula is also different from the other Recent species" (Ponder: 491).

Dredged in 40m off Karamea Bight, West Coast.

Xymene (Xymene) huttoni (Murdoch, 1900)

Synonyms: Axymene robustus (Finlay, 1924) - in part

Zeatrophon tmetus Finlay, 1930

Based on a Shakespeare Cliff (Wanganui) fossil. "Finlay (1930) separated his Recent tmetus from the Castlecliffian huttoni by its more robust shell, stronger knobs and lower peripheral groove. These features, however, are not consistent in Recent or in fossil shells, which are usually inseparable" (Ponder: 491).

"The small aperture is strongly lirate within and the distinctive strong axial and spiral sculpture, and rather depressed protoconch readily separate this species from all others in the genus" (p.491).

8-10mm height. Throughout N.Z. including Stewart Id. Sometimes intertidal but never abundant. Extends to 300 fath but usually upper sublittoral.

Xymene (Xymene) traversi (Hutton, 1873)

Synonym: Axymene corticatus (Hutton, 1873)

"Xymene traversi can be distinguished from all of the other species in Group 2 by its strong axial ribs and lack of subsidiary axial foliations. This species is peculiar in that littoral specimens are usually covered with Lithothamnion, whereas the other common littoral trophons, Xymene aucklandicus and X. plebeius, are usually clean, even when occupying the same habitat" (Ponder: 492).

Up to 12-16mm height. Common around North Id but progressively rarer S. of Cook Strait. Typically a littoral species extending to a few fathoms.

GROUP 3

"This group includes the earliest known member of the Xymene group and has most of the features that would be expected in a hypothetical ancestor of all the species of Xymene. The two species both have small shells with prominent axial lamellae and relatively large, tall, angulate or keeled protoconchs" (Ponder:492).

Fossil species with no Recent representatives.

GROUP 4

"This group includes the species previously placed in Axymene, which are distinguished from the remainder of the Xymene complex by their paucispiral protoconchs. One species, traversi (Hutton), is placed in "group 2" only on the basis of the protoconch, the teleoconch features being nearly identical to those of aucklandicus (Smith), the type species (by synonymy) of Axymene. Group 4 appears to represent a heterogeneous assortment of species which probably evolved their paucispiral protoconchs independently" (Ponder:494).

Xymene (Xymene) aucklandicus (Smith, 1902)

Synonyms: Axymene traversi erectus (Suter, 1909)

Axymene turbator Finlay, 1927

"....the forms previously known as aucklandicus, erectus and turbator are inseperable" (Ponder:494).

"Some populations are yellow or even whitish and approach Xymene traversi very closely in general appearance. Separation is difficult on anything but protoconch characters, although traversi can usually be separated by its weaker spiral sculpture and Lithothamnion-encrusted shell" (Ponder: 494).

Cook Strait (Littoral & shallow water); Timaru; Otago (down to 60 fath); Stewart Id and Foveaux Strait; Snares, Auckland and Bounty Is (0-50 fath).

Xymene (Xymene) teres (Finlay, 1930)

Similar to some sublittoral forms of aucklandicus with suppressed spiral sculpture, but has only 7 axials/whorl compared with usually 9 in aucklandicus. May prove to be only a variety of aucklandicus.

50-72 faths off Otago.

Xymene (Xymene) convexus (Suter, 1909)

"This species is easily distinguished from Xymene aucklandicus by its evenly convex whorls and coarse, gemmate sculpture, and stronger spiral cords. It is dark brown in colour and lacks the weak to strong narrow fold below the suture and the smooth depression on the shoulder which are typical of aucklandicus. In convexus the whole surface is occupied by strong spiral cords, there being three on the spire whorls and 9-10 on the body whorl" (Ponder:497).

Chatham Id (130 fath); Dusky Sound (12-15 fath); Otago Coast (40-100 fath); off Snares (50 fath); Foveaux Strait.

Xymene (Xymene) pumilus (Suter, 1899)

Synonyms: Axymene robustus (Finlay, 1924) in part

Zeatrophon n.sp. aff. bonnetii; Powell 1955:104

"Fleming (1951) considered pumilus Suter and robustus Finlay to be separate species, the former in Zeatrophon and the latter in Axymene. Examination of a large series.....confirms Finlay's (1927a) opinion that they are synonyms. The lectotype of pumilus has a worn apex but the typical "Axymene"protoconch has been observed on identical shells" (Ponder: 497).

"Powells (1955) Zeatrophon n.sp. aff bonneti is X. pumilus, the specimens being large, poorly preserved shells from the Auckland Is" (Ponder: 497).

"The large size, yellowish-white colour, and nodulose sculpture readily distinguish this species, although adult size and sculpture are rather variable. Axials often become lamellate in large shells..." (p.497). Deep water shells are smaller with more rounded ribs.

Cape Campbell (trawled); E. Otago (0-550m); Foveaux Strait; Stewart Id; Auckland Is.

LITERATURE CITED

- FINLAY, H.J. 1927 A further commentary on New Zealand molluscan systematics. Trans. N.Z. Inst. 57: 320-485
- FLEMING, C.A. 1951 Some Australasian mollusca in the British Museum (Natural History). Trans. R.Soc. N.Z. 79: 126-39
- PONDER, W.F. 1972 A Review of the genus Xymene Iredale of New Zealand (Mollusca: Muricidae) Jl R. Soc. N.Z. 2 (4): 471-99
- POWELL, A.W.B. 1955 & 1957 Shells of New Zealand. Whitcombe & Tombs N.Z.

Some Notes on Latin Pronunciation, with the meanings of some

Molluscan Names

Betty Andrews

Carolus Linnaeus, Swedish Naturalist, 1707-1778, laid the foundations of our present nomenclature of the earth's various life forms. Between 1735 and 1768 he wrote and published 12 editions of "Systema Naturae". Wisely, he chose a "dead" language, Latin, which through being "dead" remains unchanged, and which was the universal language of all scientific works in his day and remains universally understood by scientists today.

In Latin, nouns all have genders (masculine, feminine, or neuter) and the adjectives describing them follow after the noun and must agree in gender with the noun. Hence the generic names of animals and plants are usually nouns, and often feminine (at least in early names) and the specific name is often an adjective agreeing in gender with the generic name. However, a specific name can be a noun in opposition (e.g. pyrum, a pear) which does not agree in gender with the generic name.

For those who would like to see some sort of uniformity in pronunciation amongst members, I offer the following main points of Latin Pronunciation. I'd become rather lax myself through trying to make myself understood by other members, and common usage (or misusage?) tends to make things acceptable, but I think we should try to use accurate Latin pronunciation. Here I would suggest you think again about that word universal. If we anglicise the pronunciation of Latin names, the purpose of using Latin is defeated, and it will be universal only when written; it will be universally understood by, for example, a German, a Russian and a Japanese only if they all pronounce it in the same way.

Main points of Latin pronunciation:

Vowel Sounds:

a - ā (as in harp)	or	a (as in hat)
e - ē (way)	or	e (wet)
i - ī (heat)	or	i (hit) - y (<u>Greek</u>)
o - ō (go)	or	o (got)
u - ū (Luke)	or	u (look)

When a word ends with a vowel the long sound is used, e.g. rubicunda, swainsoni.

Diphthongs:

ae - aye (light)
au - ou (gout)
oe - oi (soil)
ui - we (we)
ei - ay (eight)

Consonants:

- s - so, not as in "rose" or as a z
- c - k (cat) - ch (Greek). "c" is never sibilant, as we pronounce, e.g. "censor" (Latin, cēnsor, - onis (m) - a severe judge or critic).

g - go. Again never soft as we pronounce "genus" (Latin, genus, - eris (n)
- tribe, king, class, etc.).

v - w (wet)

j - y (yet)

x - x (example) except at beginning of words, then "z" (Greek).

Pronunciation is phonetic, with the accent usually on the second to last syllable. Before trying to pronounce a word, study it thoroughly, break it into syllables, and then have a go!

After that extremely elementary Latin lesson, I thought members might be interested to learn the meanings of some of our shell names. The most common gender endings of nouns are -um (neuter), -a (feminine) and -us (masculine).

Meanings of some N.Z. shell names:

Buccinulum pertinax - būc(c)inum (n) (a shellfish like a trumpet or shepherd's horn) diminutive suffix "-ulum"; pertinax (tenacious, unyielding, stubborn).

" lineum - lineum (having lines).

Penion adustus - (Penion is a Greek word of uncertain meaning, probably from penes (poor) ; adustus (sunburned, brown).

" dilatatus - dilatatus (extended, spread out, wide).

Cominella glandiformis - com, cum (with), minae (menace), diminutive suffix "ella" (ellae); glandi (of the acorn) formis (having the form).

" maculosa - maculosa (spotted, marked, meshed like a net)

" adpersa - a (d)persa (sprinkled or sprayed)

" virgata - virgata (striped)

" nassoides - nassa (a fish net of twigs) idem (the same as, like).

Charonia capax - Charon (m) (Greek) (the ferryman who took souls over the River Styx) feminized; capax (broad, spacious, roomy).

" rubicunda - rubicunda (reddish) - now should be subspecies of lampas (bright, brilliant).

Argobuccinum tumidum - Argo (hundred-eyed mythical monster; from white spots formed by worn knobs of A. argus) buccinum (a horn-like mollusc); tumidum (swollen, puffed up).

Struthiolaria papulosa - (Struthio - is possibly from Struthiocamelus, Latin Ostrich; also possibly from Strutheus (Latin), a sparrow (Struthiocamelus means "a sparrow like a giraffe"); laria (Latin, a dwelling place); papulosa (pimpled); subspecies gigas (- giant, huge).

" vermis - worm.

Aastrofusus glans - astro (southern) fusus (spindle); glans (acorn, nut).

Pterynotus eos - pteron (Greek, a wing) otia, -orum (Greek, sea ear, - shell); eos (Goddess of the dawn).

Sigapatella novacelandiae - siga (image) patella (a small dish or plate); of New Zealand.

" superstes - surviving, lasting over.

" terraenovae - of the new land.

Janthina violacea - janthina (-orum, pl.) (garments of purple colour); violacea (violet-coloured).

" exigua - small, thin, fragile.

" globosa - spherical, globe-shaped.

Lunella smaragda - luna (the moon) ella (dimin. suffix); smaragda (emerald green).

Astraea heliotropium - astra (Greek, stars); heliotropium; (from the colour, heliotrope; a Latin noun for a plant of that colour).

Cookia sulcata - Cooki (of Cook) made into a feminine noun; sulcata (furrowed, trenched).

Trochus tiaratus - trochus (a hoop, toy hoop); tiaratus (like a turban).

" viridis - green.

Monodilepas monilifera - mono (Greek, one) di (Greek, two) lepas (Greek L., a limpet); monilifera (having a collar or necklet).

Nerita melanotragus - nerita (Latin name for a shellfish that sails on the sea); melania (blackness) tragus (a shellfish).

Pecten novaezelandiae - pecten (a comb; also the scallop shell); of New Zealand.

Chlamys gemmulata - chlamys (a Greek military cloak, usually woollen); gemmulata (like a small gem; or glistening, sparkling).

" delicatula - (delightful, fastidious).

Nemocardium pulchellum - nema (yarn, thread) cardium (Greek, heart); pulchella - dimin. of pulchra (beautiful).

Cellana radians - cellana (cell, storehouse, sanctuary); radians (radiating).

" stellifera - (starred; bearing a star).

" strigillata - (a scraper used when bathing).

Haustrum haustorium - haustrum (a machine for drawing water) haustorium (devouring, consuming).

Architectonica reevei - architectonicum (a master builder); reevei (of Reeve).

Philippia lutea - philippia (cf Philippi, a German mollusc taxonomist); lutea (clayey, yellow, orange).

Ellatritia memorata - from Triviella, dimin. of Trivia (Diana, goddess); memorata (famed, celebrated).

You will see that many names such as Philippia, Cookia, Poirieria are made from people's names, Latinised - Poirieria is named after a Frenchman, M. Poirier. To finish with, a few names Latinised from Maori words:

Maurea tigris - Maurea (Maori, one of their names for this genus; also species of sedge used for weaving ornamental belts, also the weaving itself; presumably shell named from similarity to the weaving); tigris (Latin, tiger-like).

" pellucida - bright, shining through.

" punctulata - punctured.

Tanea zelandica - tanea (Maori, to choke, encircle the throat, and hence a necklet); of N.Z.

Tawera spissa - tawera (Maori, name for planet Venus, used as Venus is type-genus of family veneridae; also a burning or imprint such as tattoo); spissa (Latin, dense, thick, plentiful).

Glossary of Terms used in the description of Bivalves

Compiled by Joan Beu

Adductor scar - Impression on inside of valve made by attachment of muscle which functions for closure of valve.

Anisomyarian - With one adductor muscle (anterior) much reduced or absent.

Anterior lateral tooth - Lateral tooth situated in front of beaks.

Auricle - Forward or backward projection of shell along hinge line in some pelecypods; also called ear.

Bead - Small round protuberance on rib.

Beak - More or less sharp pointed projection at the initial point of shell growth, located along or above hinge line.

Buttress - Ridge on inner surface of a valve which serves as support for part of hinge.

Byssus - Bundle of hairlike strands by which temporary attachment of bivalve can be made to extraneous objects.

Byssal foramen - Opening in right valve in Anomiidae for passage of calcified byssus.

Byssal gape - Opening between margins of shell for passage of byssus.

Byssal notch - Indentation on anterior edge of some shells for protrusion of threadlike attachment called byssus, most common on pectinoid shell on right valve, which is lowermost, allowing protrusion of the small foot without opening valve widely.

Byssal sinus - Indentation beneath auricle of left valve of pectinoid shells on anterior margin.

Cancellate - Consisting of intersecting radial and commarginal threads.

Cardinal area - Plane or curved surface between beak and hinge line, generally distinguished from remainder of valve exterior by sharply angulated border.

Cardinal axis - Imaginary straight line along which two valves of shell are hinged.

Cardinal tooth - Hinge tooth situated close to beak.

Carina - Prominent keel like ridge.

Chevron groove - V-shaped furrow on cardinal area in some Arcacea and early Pectinacea for insertion of ligament.

Chondrophore - Relatively prominent internal spoon shaped structure, which holds an internal ligament (resilium)

Concentric - With direction coinciding with that of growth lines.

- Commisure - Line of junction between two valves.
- Convexity - Degree of inflation.
- Corselet - Differentiated posterior area.
- Costa - Radial ridge on shell surface formed by thickening of shell.
- Crenate - With notches along edge or crest (as of ribs).
- Cryptodont - Lacking hinge teeth (applied to certain groups of early origin only)
- Ctenodont - With numerous short hinge teeth transverse to margin (applied to certain groups of early origin only)
- Ctenolium - Comblike row of small teeth on lower side of byssal notch in some Pectinacea.
- Dentition - Hinge teeth and sockets considered collectively.
- Dimyarian - With two adductor muscles.
- Disc - In Pectinacea, whole of valve except auricles.
- Dissoconch - Post larval shell.
- Divaricate - Type of ornament composed of pairs of divergent ribs.
- Dorsal - Direction toward part of shell containing hinge line.
- Dysodont - With small weak teeth close to beaks (as in some Mytilacea).
- Ear - Small extension of dorsal region of shell, commonly separated from body by notch or sinus. Same as auricle.
- Edentulous - Lacking hinge teeth.
- Entire - Lacking sinus (applied to pallial line).
- Equilateral - With parts of shell anterior and posterior to beaks equal in length or almost so.
- Equivalve - With two valves of same shape and size.
- Escutcheon - Depressed area along hinge line beyond beak, corresponding to posterior part of cardinal area.
- Excurrent - Forming passage for current of water expelled from mantle cavity (applied to mantle opening or syphon)
- Exhalant - Same as excurrent.
- Fold - Rather broad undulation of surface of shell, directed either radially or commarginally.
- Foot - Protrusible muscular structure extending from mid-line of body, anteroventrally in more typical bivalves, and used for burrowing or locomotion.
- Foramen - Opening or hole.
- Gape - Localised opening of shell remaining between margins, when valves are drawn together by adductor muscles.

Growth line - Line on surface of shell, one of usually irregular arranged series, marking position of margin at some stage of growth.

Height - Distance from dorsal to ventral margin measured normal to length.

Heterodont - with distinctly differentiated cardinal and lateral teeth.

Heteromyarian - With one adductor muscle (anterior) much reduced

Hinge - Collective term for structures of dorsal region which function during opening and closing of valves.

Hinge axis - Imaginary straight line about which two valves of shell are hinged.

Hinge plate - Internal surface adjacent to hinge line along which hinge teeth project.

Hinge teeth - Projections from hinge plate for articulation of valves

Incurrent - Forming passage for current of water drawn into mantle cavity (applied to mantle opening or siphon)

Inequilateral - With parts of shell anterior and posterior to beaks differing appreciably in length.

Inequivalve - With one valve larger than other.

Inflation - Distance between two planes parallel to plane of commissure and touching outermost part of the two valves.

Isodont - With small number of symmetrically arranged teeth; examples, *Spondylus*, *Plicatula*.

Isomyarian - With two adductor muscles equal in size or almost so.

Keel - Projecting ridge; same as carina.

Lamella - Thin plate.

Lamina - Thin plate.

Lateral tooth - Hinge tooth wholly or partly located some distance from beaks.

Left valve - Valve lying on left hand side when shell is placed with anterior end pointing away from observer and commissure vertical, the hinge being uppermost.

Length - Distance from anterior to posterior margin at farthest points or measured parallel to hinge line.

Ligament - Horny elastic structure or structures joining two valves of shell dorsally and acting as a spring causing them to open when adductor muscles relax.

Ligament area - Portion of surface along hinge line to which ligament is attached.

Ligament groove - Narrow depression in cardinal area for attachment of fibres of ligament.

Ligament pit - Relatively broad depression in cardinal area for attachment of ligament.

Lithodesma - Small calcareous plate reinforcing internal ligament in some genera.

Lunule - Depressed plane or curved area along hinge line in front of beak, equivalent to anterior part of cardinal area.

Mantle - Integument that surrounds vital organs of molluscs and secretes shell.

Monomyarian - With only one adductor muscle (posterior).

Muscle scar - Impression on interior of shell marking former place of attachment of a muscle.

Myophore - Process for attachment of muscle (usually adductor).

Nacreous - Type of shell structure consisting of thin leaves of aragonite parallel to inner surface of shell and exhibiting characteristic lustre.

Nepionic - Earliest post larval stage.

Nymph - Narrow lunate platform extending posteriorly from beak along dorsal margin and serving for attachment of ligament.

Orthodont - Type of hinge in which direction of teeth is parallel to cardinal margin or almost so.

Pallet - Small calcareous structure present in Teredinidae, one of pair closing end of boring when siphons are retracted.

Pallial - Pertaining to the mantle.

Pallial line - Linear depression on inside of pelecypod shell along ventral side, marking inner margin of inner mantle edges.

Pallial retractor muscles - Muscles withdrawing marginal parts of mantle within shell where there is no distinct line of muscle attachment.

Pallial sinus - Inward deflection of posterior part of pallial line, defining space for retraction of siphons.

Pedal gape - Opening between margins of shell for protrusion of foot.

Periostracum - Thin coat of horny material covering calcareous part of shell.

Plane of commissure - Surface approximately coinciding with valve margins.

Plica - Radially disposed ribs formed by fold that involves the entire thickness of shell

Posterior - Direction or part of shell toward position of anus and siphonal opening; in most pelecypods opposite to inclination of beak.

Posterior area - Part of surface of valve posterior to posterior ridge.

Posterior lateral tooth - Lateral tooth situated posteriorly to beaks and (in heterodonts) posteriorly to ligament.

Posterior ridge - Ridge passing over or originating near umbo and running diagonally towards posteroventral part of valve.

Posterior slope - Sector of surface of valve running posteroventrally from umbo.

Prionodont - Type of hinge in which teeth are developed in direction transverse to cardinal margin; virtually the same as taxodont.

Prismatic - Type of shell structure consisting of prisms of calcite or of aragonite.

Prodissoconch - Shell secreted by the larva or embryo and preserved at the beak of some adult shells.

Radial-Direction of growth outward from beak at any point on surface of shell commonly indicated by direction of costa or other element of ornament.

Resiliifer (or resiliifer) - Recess or process for attachment of internal ligament.

Resilium - Part of ligament below level of valve margins and under compression instead of tension.

Reticulate - With network of oblique intersecting threads or other elements of ornament.

Rib - Moderately broad and prominent elevation of surface of shell, directed radially or otherwise; same as costa.

Riblet - Rather narrow elevation of surface of shell; same as costella.

Right valve - Shell on right side of anteroposterior axis; among pelecypods which lie on their sides, it is generally lowermost in pectinoids and uppermost in oysters.

Rostrate - With pointed beaklike end.

Scalloped - With series of regular internal flutings corresponding to external costae, term applied to shell margin.

Schizodont - With one tooth (median of L.V.) broad and bifid.

Sculpture - Regular relief pattern present on surface of many shells.

Sinus - Indentation, embayment.

Siphon - Tubelike extention of mantle for passage of inhalent or exhalent Current.

Socket - Depression in hinge plate for reception of a hinge tooth of opposite valve

Stria² - Narrow linear furrow or raised line on surface of shell.

Sulcus - Radial depression of surface of shell.

Surface ornament - Regular relief pattern present on the surface of many shells.

Taxodont - With numerous short hinge teeth, some or all transverse to hinge margin.

Thread - Narrow elevation of surface of shell.

Transposed hinge - Condition in which certain hinge teeth present in one valve occupy positions of teeth usually found in other.

Umbo - Very strongly convex part of valve adjacent to beak.

Valve - Part of shell lying on either side of hinge line.

Ventral - Direction or part of shell lying opposite the hinge line; generally located lowermost in pelecypods which move about freely.

Special terms for Pholadidae.

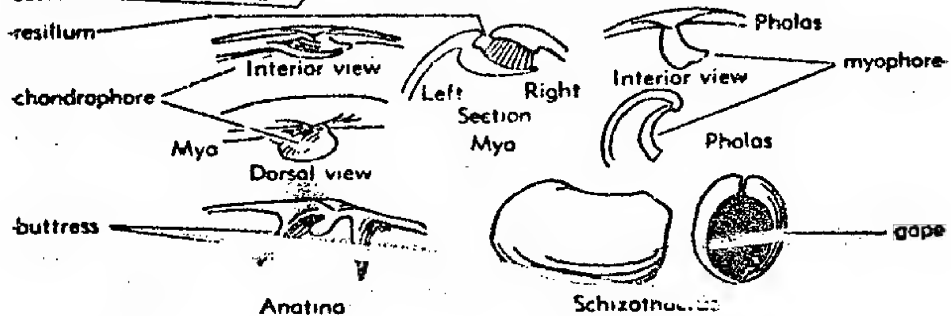
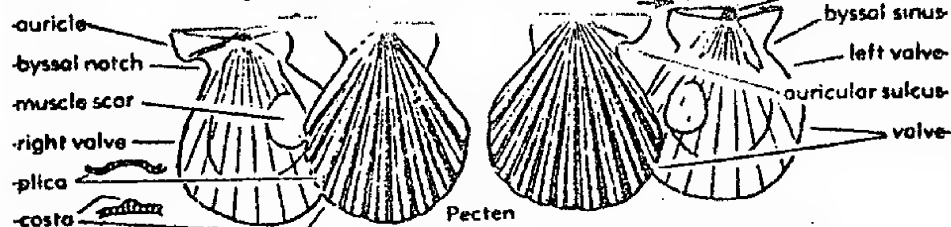
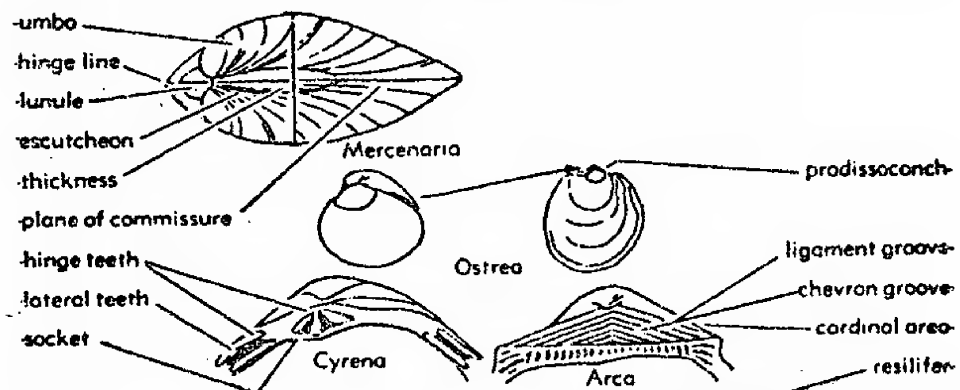
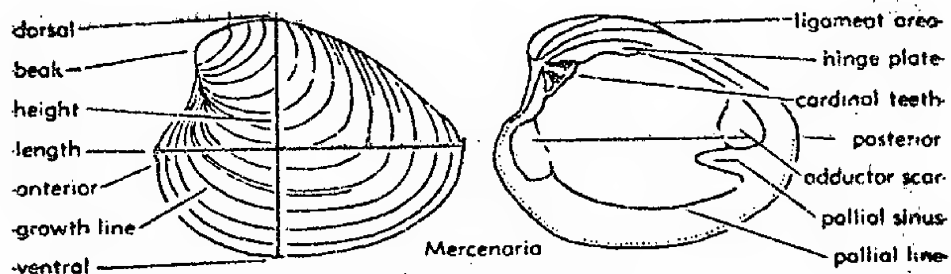
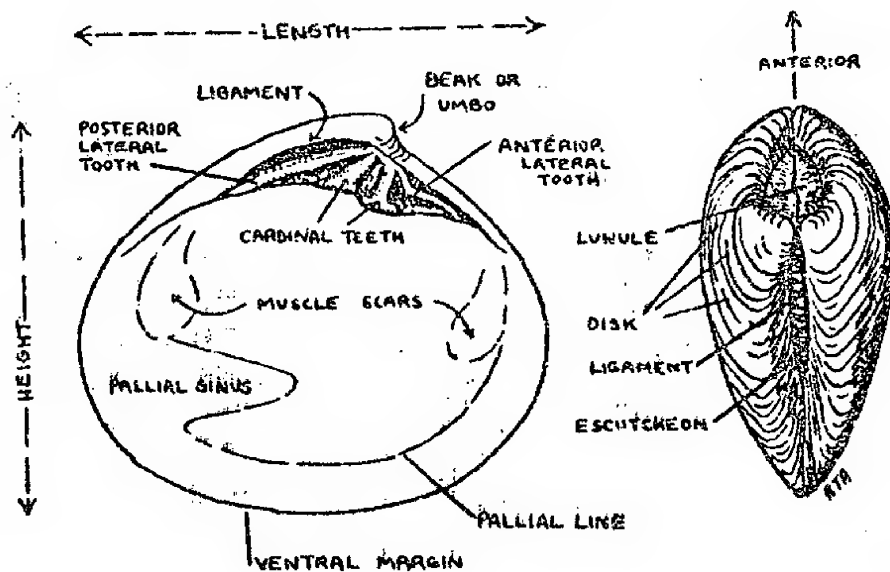
Callum - Secondary calcareous structure present in some Pholadidae, forming anterior extension of shell proper and closing pedal gap in adult.

Metaplex - Long narrow accessory plate covering gap between posterodorsal margins in some pholadidae.

Mesoplex - Transversely elongated accessory plate lying athwart umbonal region in some Pholadidae.

Protoplex - Flat spearhead like accessory plate, in one piece or divided longitudinally into two, situated at anterior end of dorsal margin in some Pholadidae.

Siphonoplex - Tubular secondary calcareous structure forming posterior extension of shell in some pholadidae and protecting proximal end of siphons.



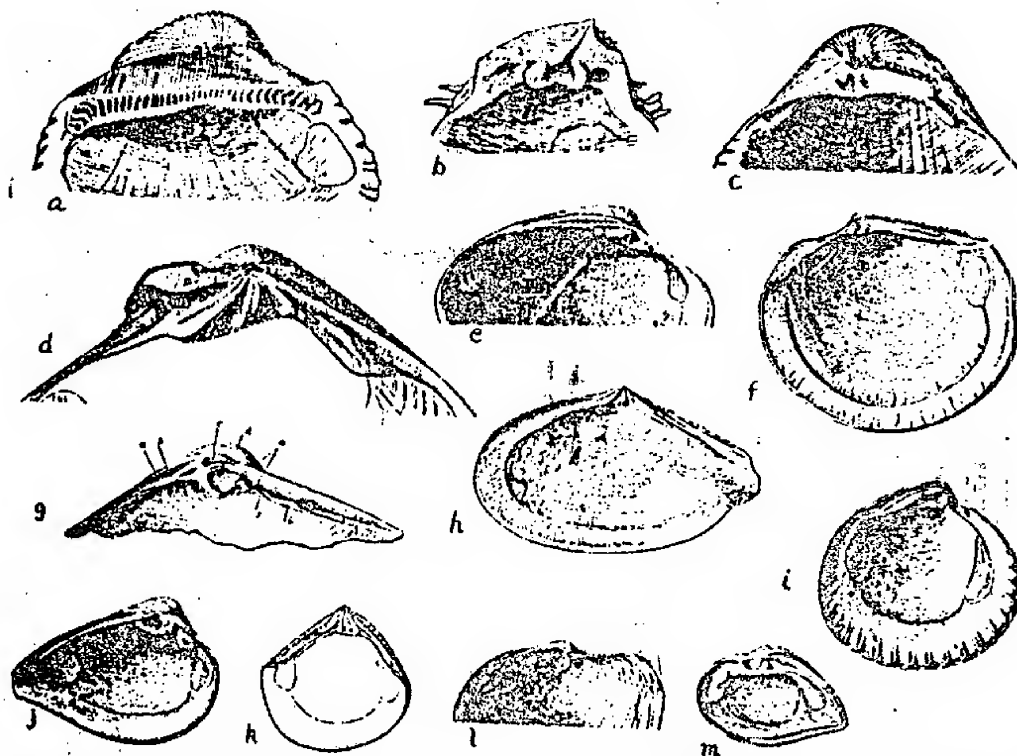
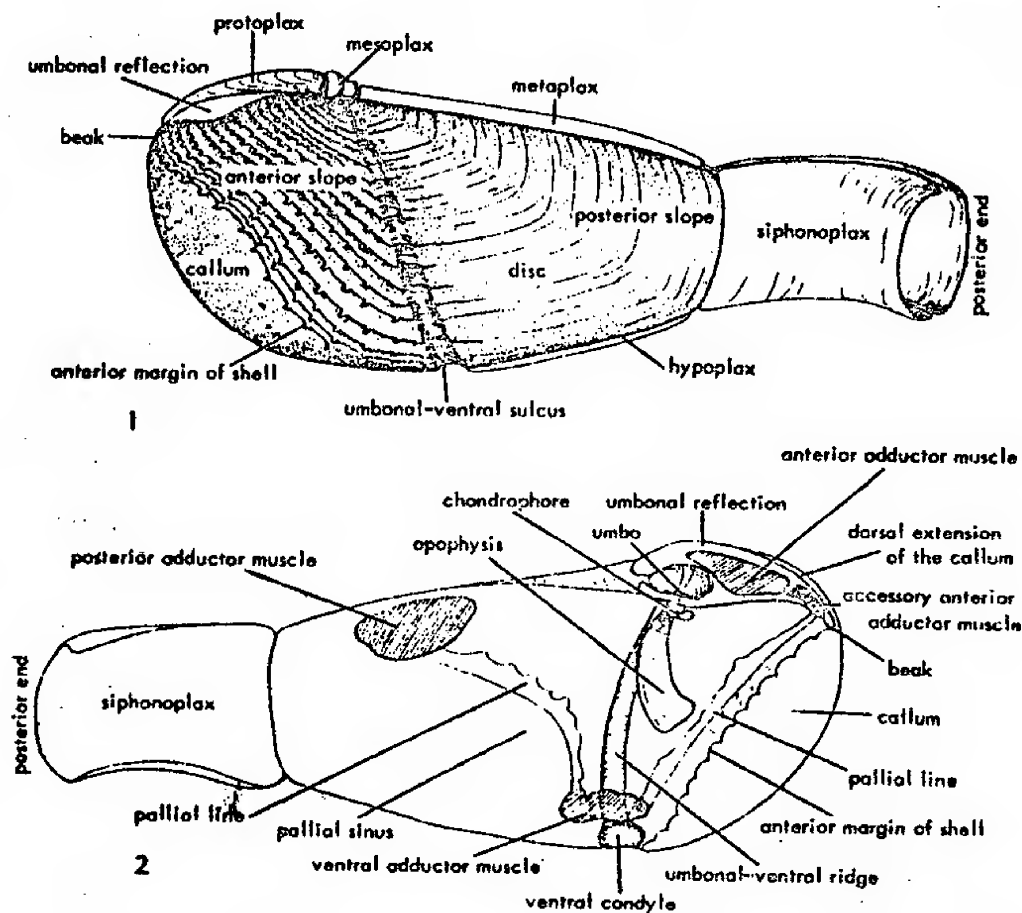


FIGURE 28. Various types of bivalve hinges. a, Arcidae (*Noctia ponderosa* Say); b, Spondylidae (*Spondylus*); c, Cardiidae (*Dinocardium vanhyningi* Clench and Smith); d, Veneridae (*Tivola stultorum* Mawe); e, Veneridae (*Callocardia texasiana* Dall); f, Lucinidae (*Phacoides annulatus* Reeve); g, Mactridae (*Mactra alata* Spengler); h, Tellinidae (*Tellina idae* Dall); i, Carditidae (*Venericardia*); j, Mactridae (*Rangia*); k, Crassatellidae (*Crassinella limulata* Conrad); l, Periplomatidae (*Periploma discus* Stearns); m, Corbulidae (*Corbula*).



Side views of LV (1, exterior, 2, interior) of diagrammatic composite shell showing morphological features of Pholadidae

DATA TO RECORD WITH YOUR SHELLS AND FOSSILS

by Alan Beu

Apart from the initial acquiring of "pretty" shells that started us all off in our collecting, the collecting of shells is an aspect of the science of zoology. "Thinking" shell collectors, who do not merely acquire shells in the same way as some people do postage stamps, are interested in the habitat, distribution and ecology of the molluscs that make the exoskeletons we collect. Collectors very often make useful or even major contributions to the work of the relatively few "professional shell collectors" (conchologists, malacologists and paleontologists) by gathering rare specimens, finding living specimens of species usually only found as empty shells, etc. Your collection can be an important scientific contribution in its own right IF your specimens are kept in separate lots (best in individual cardboard trays, in their boxes or drawers) with good labels. There is little point in keeping a collection of shells that are not labelled at least with locality, date and collector, or a collection of fossils with data on these plus stratigraphic position. I hope all readers will follow this article and try to record all possible data with their specimens as accurately as possible.

Recent Shells

1. Locality: Everyone has a vague idea of where he or she collected that nice Volute or Penion, but can you remember all the details of where little Buccinum and bivalves are from? To be useful, the label with each locality lot of specimens should record the bay or beach where they were found, or if it's a long beach, how many km along it from a prominent point (remember: keep it metric), and an idea of the general area (e.g. "E. side Bland Bay, Matapouri, Northland"). For dredged or trawled specimens a latitude and longitude may help to locate them.
2. State of Tide: If you find specimens alive in the intertidal zone, it is useful to record how high the tide was, and how far above or below high or low tide mark you found them. This could be an important aspect of the ecology of a little-studied species (most New Zealand species have been studied little at present).
3. Depth: If you dredge or trawl shells, or get them from trawlers, you should record the depth of water they were taken in as accurately as possible. For trawled shells, even the skipper's approximate depth is useful information.
4. Date: Usually, for shells washed up on beaches or for common shells you can find at a well-known locality all year around, it is adequate to record the month and year. If you collect a rare or uncommon species alive in its natural habitat and record the state of tide, etc., on the label, you should record also the exact day so that the expected tide heights for the day can be found from tables.
5. Name of the Collector(s):
6. Grid Reference:(see below) Especially useful for small bays on intricate coasts where you collect unusual species alive, or for freshwater or landsnail localities.

7. Ecology of land and freshwater molluscs; the substrate of freshwater molluscs and the scrub, logs, or species of tree land snails are found on is a most fundamental aspect of their biology and should be recorded, as should the altitude on mountains, etc., dampness or dryness of bush, and any unusual aspect of the ecological conditions you find specimens in.

Thus the label of our shell from Matapouri might read: "Nassarius particeps Hedley. Alive, 0.5 m below L W S (low water spring tide level), small headland E. side Bland Bay, Matapouri, Northland. A.Z. Smith, 27 May 1999".

Fossil Shells

Many of our members are now becoming interested in fossil shells, and starting to put together good collections of them. Most people are careful to record the type of locality information it's normal to record for Recent shells (although, clearly, depth and tide are irrelevant) but not many seem aware of the even greater importance of recording the bed, or stratum, of rock from which the fossils were collected.

If you collect fossils from a single, well-known locality where you can recognise only a single rock unit (e.g., a sandstone cliff) the locality information will convey the details of stratigraphy to a geologist studying your specimens, provided you record details carefully. It's especially important to record grid references for any fossil localities that are not really well known. A good example is the gully known as "The Pinnacles", west of Castlecliff, Wanganui, where almost everyone collects from the Pinnacle Sand in fallen blocks and in the cliff at the head of the gully, and a label reading "Pinnacles, Castlecliff, Wanganui" with collector and date, would be adequate.

However, in a long sequence of beds of rock such as is exposed along the coast at Castlecliff, the many different beds each contain different fossils. This is because they were deposited under the sea at different times, at different depths, and at different distances from land. The ecology of the fossil shells (paleoecology) is an interesting study in itself, and also can be used to determine the depth, etc., at which the rock was deposited, and its geological age, provided that the fossils from different beds don't get muddled up. Obviously, a paleontologist finding Urolophus and Struthiolaria vermis in a collection from one place would be puzzled as to how they came to occur together, when they are never found living together, but a collector who had merely dropped them in one bag while walking along in front of the cliff would be confusing the evidence about the fossils and rocks by not keeping separate collections in separate bags or boxes.

For most localities that occur in well-known long cliff sections, whether river or sea cliffs, the stratigraphy has been described in shorter papers or in Geological Survey bulletins, and geological maps are available for all of New Zealand at a scale of 4 inches = 1 mile, and for parts of New Zealand at 1 inch = 1 mile. Members wishing to collect fossils are urged to contact me at a meeting (or write if you are out of town: Dr Alan Beu, N.Z. Geological Survey, P.O. Box 30368, Lower Hutt) for information on the locality from which they are going to collect. Better still, go there on one of our club trips, or at least with other members who've been before and know the stratigraphy.

A lot more information on the collecting of fossils can be found on p. 11-12 of Dr Fleming's "Marwick's illustrations of New Zealand Shells" (DSIR Bulletin 173, 1966; 456 pp., 145 pls) which is much the most useful single guide to identification of New Zealand fossil shells. (Copy in Club library).

In the next issue we will have an account of the naming of rocks and the geological time scale, and some New Zealand fossil localities.

Grid References

The only detailed topographic maps available for most of New Zealand at present are the N.Z. Map Series 1 maps at a scale of 1 inch = 1 mile (1:63,360). The whole country is now covered by this series, and they can be bought quite cheaply from many book shops and from the Lands and Survey Department map sales office. They are ruled with a grid at intervals of 1000 yards, and the grid lines are numbered along the edges, so that by quoting the numbers of the two grid lines crossing nearest to a locality and estimating the tenths of the grid square the locality lies at, a grid reference can be given that uniquely identifies a locality to the nearest 100 yards.

Instructions in determining grid references are given quite clearly on the bottom of each map sheet, and repeated here. In writing down the reference, the map sheet number (e.g., N137) is given first, followed by an oblique stroke. Next, look along the top or bottom east-west edge of the map for the number of the north-south grid line nearest to the locality. Each line bears a three-figure number, but ignore the first, smaller figure (part of the N.Z.-wide grid) and write down the next two (called the "easting"). Then estimate how many tenths of the square from the grid line to the locality, and write down your three numbers - the two from the map edge and your estimated tenth (e.g., N137/863). Then look along the eastern or western north-south edge of the map for the east-west grid line nearest to your locality, and again write down the second and third figures of its number (the two larger figures) and estimate and record the tenths of the square (the "northing"). The complete reference now looks like: N137/863471. Remember, ALWAYS write down the "easting" before the "northing" (if you get them reversed, the reference will plot in the wrong place).

For completeness, with fossil localities it is customary to write down the date of the map edition in brackets after the reference, as the grids were sometimes drawn slightly incorrectly on early editions and corrected later, so that your locality may differ in position by 200 to 300 yards from edition to edition. So a full grid reference might read: N137/863471 (1972).

Metric Grid References:

Now that the country is just about covered by 1 inch = 1 mile maps, we are all going to have to change to metric ones, at 1:50,000 (N.Z. map series 260) and 1:25,000 (N.Z. MS 270), and in future grid references will be given on the 1:50,000 maps. The National Fossil Record, administered by the Geological Society of New Zealand, officially changed to metric maps at 1 December 1975, so from now on geologists will locate fossils by metric grid references. The division of the country into sheets has been renumbered for the 1:50,000 series, running from A in the west (Fiordland) to Z in east (East Cape) and from 1 in the north to 50 in the south. For example, the Three Kings Islands are on sheet L01, Wellington on sheet R27, and Bluff on sheet D46. The maps at the end of this article show the division into sheets for the 1:50,000 scale, their division into 4 for the 1:25,000 sheets (same numbers as 1:50,000, with suffixes A-D), and the location of the master-files for areas of the National Fossil Record.

A computer programme is available that enables rapid conversion of large numbers of the old, non-metric grid references, that have been used on 40,000 fossil record forms, to the new metric ones. However, for day-to-day work with a few grid references we must be content with determining the grid reference of a

locality on the old NZMS 1 sheets (and, indeed, this will be adequate for private collections), plotting this grid reference on sheets with the new metric grid ruled over the old one, and reading the metric grid off in the same way as is explained above for non-metric ones.

As yet no NZMS 260 or 270 sheets have been printed, but Lands and Survey Dept. have supplied a few sets of NZMS 1 sheets, overruled with the metric grid and sheet boundaries, to organisations urgently requiring them, and one set is held at N.Z. Geological Survey. Any member who wishes to file an interesting or new fossil locality with the National Fossil Record (and members are URGED to do so) can apply to me for a conversion of their grid reference to a metric one. Fossil record forms are obtained from Dr C.S. Nelson, Secretary, Geological Society of New Zealand, c/- Earth Sciences Department, University of Waikato, Hamilton. A price of 50 cents is charged for each pad of 50 forms, to help defray expenses of printing the forms and administering the system.

INDEX TO
NZMS 270 NEW ZEALAND TOPOPLOT SERIES 1 : 25 000
NORTH ISLAND

Sheets numbered
in V178

A	B
C	D

N.Z.G.S.
Otago

Auckland
University

N.Z.G.S.
Rotorua

N.Z.G.S.
Lower Hutt

N.Z.G.S.
Lower Hutt

Victoria University
Wellington

INDEX TO
NZMS 270 NEW ZEALAND TOPOPLOT SERIES 1 : 25 000
SOUTH ISLAND

Sheets numbered
in VI7B

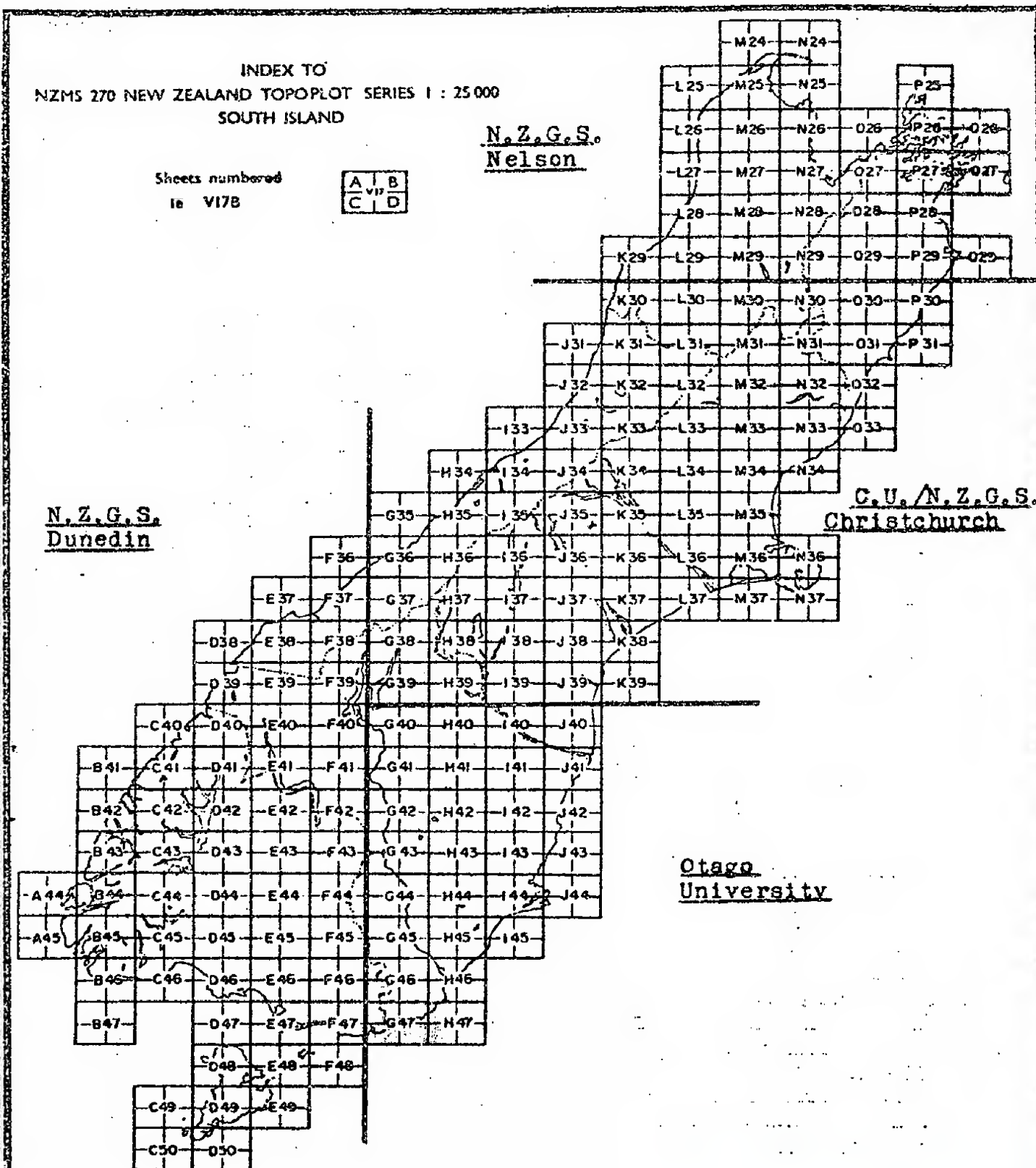
A	B
C	D

N.Z.G.S.
Nelson

N.Z.G.S.
Dunedin

C.U. N.Z.G.S.
Christchurch

Otago
University



WELLINGTON SHELL CLUB

Family: FISSURELLIDAE Risso

Study Group 27 Jan, 1972. Notes by F. M. Climo

.....

Family: FISSURELLIDAE Risso

Animal bilaterally symmetrical externally with the anal orifice on the median line, situated either anteriorly, centrally or posteriorly. Gills are paired, one on each side of the back. Mantle continuous or slit anteriorly. Adductor muscle is horseshoe-shaped and open anteriorly. Radula with central, lateral and marginal teeth, the outer lateral tooth large and modified.

Shell bilaterally symmetrical, conical and limpet-shaped, the only spiral section being the protoconch. With a perforation, an anterior slip or emargination for passage of anus. Not nacreous. Adductor muscle impression horseshoe-shaped.

Carboniferous to Recent. (After Suter, 1913:96)

For a complete review of Suter's (1913) treatment of parts of the family, see Iredale (1915:433-35).

Subfamily: FISSURELLINAE Pilsbry

Central tooth of radula narrow. Shell completely external & capable of holding whole animal. Shell apex wholly removed by anal perforation which is ringed on the inside by a callus with entire margins, not truncated or excavated posteriorly. Pliocene-Recent. (After Suter, 1913:96).

The "Key-hole Limpets".

Genus: Monodilepas Finlay, 1927

Type species: Lucopina monilifera Hutton, 1873

Dell (1952:145) discusses the relationship of the familiar N.Z. Monodilepas with the related Australian genera Amblychilepas Pilsbry, Sophismalepas Iredale and Cosmetalepas Iredale. Radular study indicates that Monodilepas is most closely related to the Australian Cosmetalepas but the shell sculpture is different.

Shell sculpture basically reticulate.

Three species are represented in the N.Z. area, one with 3 subspecies, and one is found at the subantarctic Auckland Islands.

The shell features differentiating species and subspecies are very slight. Time will tell how acceptable they are when more material is available for study, but Monodilepas appears to be relatively non-plastic and small differences may be valuable as taxonomic characters. However, the alternative at the other extreme (all one species) is also a distinct possibility.

Monodilepas monilifera (Hutton, 1873)

The species is found from the Snares Islands to the Cook Strait region. It contains 3 subspecies, the Chatham Island one sometimes listed as a full species (e.g. Powell, 1962:77).

The subtriangular shape of the internal callus separates monilifera from diem enensis in which it is either oval or irregularly hexagonal. M. monilifera is not as wide as otagoensis, its foramen is proportionally larger and its anterior outline not so rounded. M. carnleyensis, with some effort, can be differentiated from monilifera s.str. on minor sculptural grounds and slight differences in radular morphology.

Monodilepas monilifera monilifera (Hutton, 1873)

A Forsterian subspecies - Oamaru to the Snares. Size up to 22mm in length. Fossil back to Pliocene where specimens are larger (over 23mm).

Characteristics of the nominate subspecies are:

- i/ attenuate anterior outline
- ii/ subtriangular muscle scar
- iii/ netted sculpture with concentric radial ridges subequal
- iv/ foramen of moderate size (After Dell, 1952:148)

Quite a variable subspecies, radials ranging in no. from 64 to 115.

Monodilepas monilifera cookiana Dell, 1952

A small shell under 12mm in diameter, radials numbering in the 50's & 60's. Sculpture reticulate but the radials stronger. Distinguished from monilifera s.str. as follows:

- i/ smaller size
 - ii/ oval outline with slight anterior attenuation
- Known from Cook Strait in 62 faths. (Dell, 1952:149).

Monodilepas monilifera skinneri Finlay, 1928

Distinguishing features of skinneri are:

- i/ subquadrangular outline
 - ii/ subparallel lateral margins
 - iii/ narrow shell
 - iv/ subordination of concentric sculpture to radial
- Up to 28.5mm in length. Chatham Islands.

Monodilepas diemenensis Finlay, 1930

Distinguishing features of diemenensis are:

- i/ internal foramen callus oval or irregularly hexagonal
- ii/ when shell placed upon a flat surface the post. margin is raised.
- iii/ foramen larger than in other forms & nearer ant. margin. A northern species, common at Cape Maria van Diemen - also known from off the Three Kings Islands and at Whangaroa. Up to 18.5mm in length and with 59-103 radials.

Monodilepas otagoensis Finlay, 1930

Its major distinguishing features are:

- i/ very broad shell
- ii/ very small foramen
- iii/ rounded anterior outline

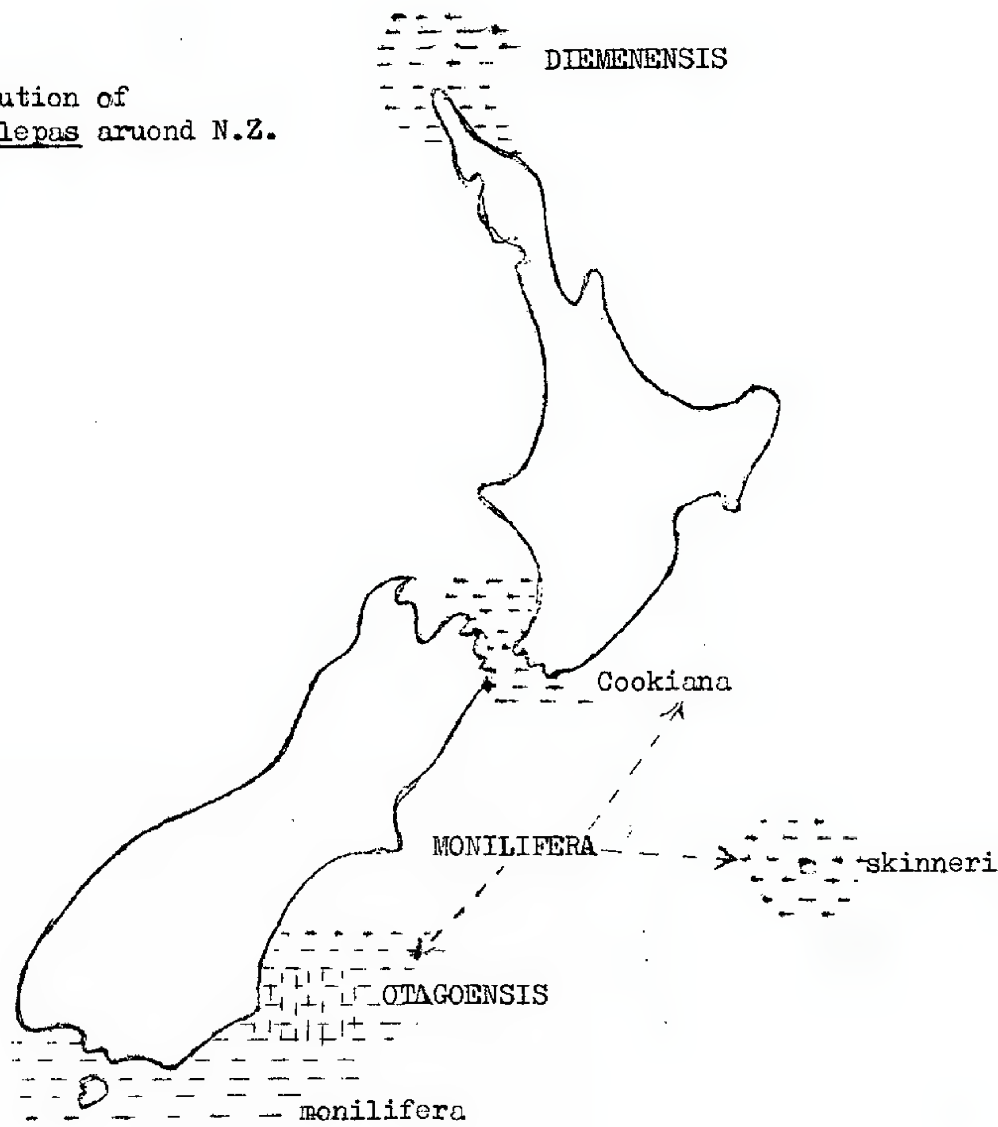
Known from 50 faths off Otago Harbours.

Monodilepas carnleyensis Powell, 1955

"Very similar to monilifera of similar size, but differing noticeably in the sculpture, which consists of about 72 relatively strong and closely rounded radials, crossed by numerous weak concentric ridges in the early stages, but rapidly resolving into mere growth lines" (Powell, 1955:48). The shell margin is crenulated in all growth stages in carnleyensis but this feature is only developed in the juvenile of monilifera.

Carnley Harbour, Auckland Islands.

Distribution of
Monodilepas around N.Z.



Auckland Is. CARNLEYENSIS

SUBFAMILY: EMARGINULINAE Pilsbry

"Apex of shell generally not removed, the anal tube occupying an anterior slit, notch, or sinuation, or if apex be removed by a perforation the hole is provided internally with a shelf or septum projecting forward and downward from behind it, or if bounded by a callus the latter is truncated or excavated posteriorly. Central tooth of radula broad" (Suter, 1913:97-98).

The subfamily is represented in N.Z. by the following genera:

Incisura Hedley (1 species); Emarginula Lam. (1 species); Tugali Gray (?4 species); Montfortula Iredale (1 species); Puncturella Lowe (2 species); Zeidora A. Adams (1 species); Scutus Mountfort (1 species); Vacerrena Iredale (1 species). Puncturella and Vacerrena (on a smaller scale) show a superficial resemblance to Monodilepas and Zeidora (ditto) to Emarginula.

Genus: Montfortula Iredale, 1915

Type species: Emarginula rugosa Q. & G., 1834

Rounded-oval shell, limpet-like, apex approx. central, strongly radially ribbed. Extremely short anal notch continued inside shell as a groove. Radial ribs impinging on anal notch not modified as in Tugali Gray.

Montfortula rugosa (Q. & G., 1834)
 Syns. M. chathamensis Finlay, 1928
M. lyallensis Mestayer, 1928
 The Australian M. conoidea (Reeve) is also a synonym
 (see Dell, 1971:37-41).

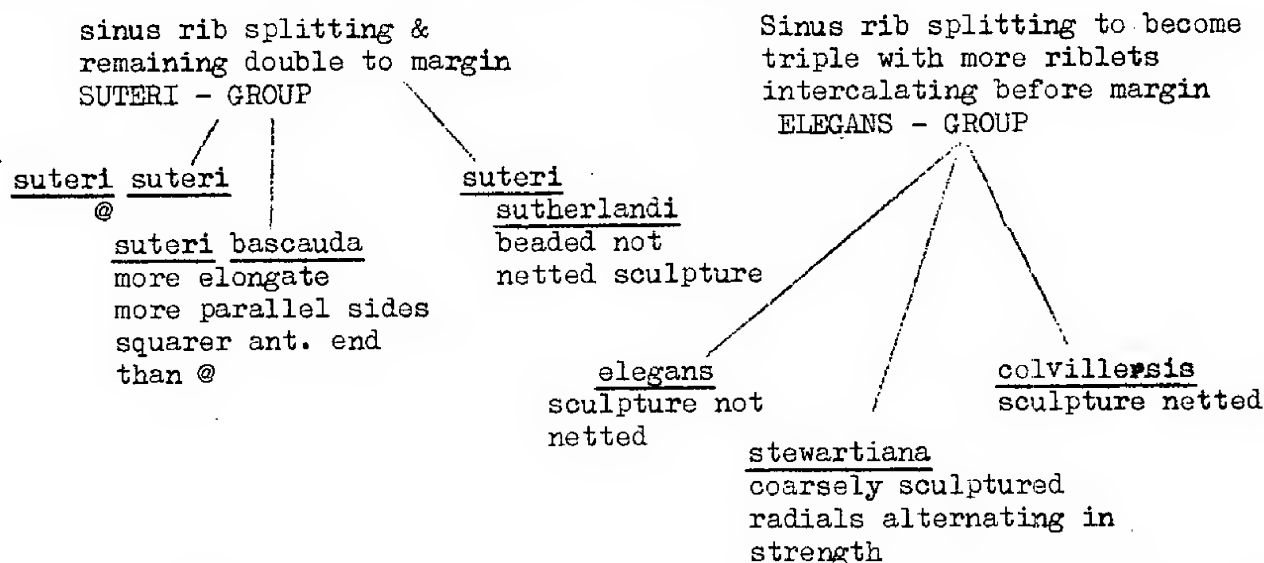
"Montfortula has an extremely limited range in New Zealand, being apparently confined to the vicinity of the Kaikoura Peninsula and to the Chatham Islands, with some limited occurrences from time to time in the Cook Strait area. Reasons for such a restricted distribution are difficult to find, but distributions of this type are found in other species which appear to be recent derivations from Australia" (Dell, 1971:41).

Genus: Tugali Gray, 1843

Type species: Tugali elegans Gray, 1843

Shell limpet-like, unicoloured usually white or grey, rounded at post. end & generally tapering off posteriorly to some extent. Anal notch and internal groove (sinus) both very shallow. Sculpture of radial ribs and concentric lamellae, imparting a basically reticulate sculpture pattern. Sinus riblets modified.

The species and subspecies of Tugali in N.Z. need further clarification but this must await more material and anatomical studies. I follow Finlay's (1927:344-45) criteria for recognizing species-groups, viz.:



The differences between some of the taxa in the above diagram seem very trivial especially since Tugali is never collected in large quantity and knowledge of variation is slight to say the least.. There are a no. of specimens in the DOM. MUS. collection which will not fit into any of the species and subspecies listed above, falling between defined 'taxa'. At a quick glance it appears that there are certainly 2 species in N.Z. but a statement beyond that would be extremely shaky.

Tugali elegans Gray, 1843

Relatively large (up to 45mm), with rounded posterior end, strong taper anteriorly, animal orange in colour. Sinus rib splitting into 3. Sculpture not reticulate to degree of netting.

North Island, northern South Island and Chathams.

Tugali colvillensis Finlay, 1927

Shell intermediate in size between suteri-bascauda group and elegans (22mm in length). Laterally compressed and elongate. Sinus rib splitting into 3 smaller ribs. Sculpture netted.

Type locality 20-25 faths in Hauraki Gulf. Finlay (1927:345) also records the species from the littoral of Dunedin Harbour. I note that Powell (checklist 1957) does not list the southern record (the specimens were from the Powell Collection). The distribution looks pretty weird as Finlay has it.

Tugali stewartiana Powell, 1939

More coarsely sculptured than other N.Z. species. The radials are dominant & alternate in strength. Concentric ridges fewer and stronger than in elegans. Sculpture openly netted as in suteri but sinus rib split into 3. Shell not as tapered as elegans. Up to approx. 28mm in length. Stewart Island and environs.

Tugali suteri Thiele, 1916

This species is smaller than the other species mentioned (10-18mm in length), with netted sculpture and with the sinus rib splitting into only 2 subsidiary riblets. The species has been somewhat dubiously split into 3 subspecies, the origins of two of these names worthy of some explanation. Thiele, describing suteri, and Hedley describing bascauda were, in fact, describing the same thing. Finlay (1927:344) noted, however, that whereas Thiele's type locality for suteri was the Chatham Islands, Hedley's type locality for bascauda was "near Wellington." Hedley recorded his bascauda from the Chathams (i.e. in effect noting no difference between suteri and bascauda) as well. Finlay claimed to notice differences between the specimens from each locality and stated: "...the Moriorian form regionally differs from the mainland shell in greater elongation, generally more parallel sides, and squarely, not narrowly, rounded anterior end." Powell's 1957 checklist accepts both subspecific names, but bascauda is listed as a synonym of suteri in the 1962 edition of "Shells of New Zealand". Tugali bascauda Hedley, 1917 is most probably a synonym of T. suteri Thiele, 1916.

Tugali suteri suteri Thiele, 1916

Syn. Tugali bascauda Hedley, 1917

Cook Strait region northwards and Chatham Islands. Coll. intertidally in shell-grit and dredged.

Tugali suteri sutherlandi Fleming, 1948

"A southern representative of the suteri-bascauda group, differing from both in being more regularly oval in outline, with less straight sides, and in sculpture". The concentric lamellae of the new race are weaker, causing beads where they cross the radials but not strong enough in the interspaces to form netted sculpture. Profile similar to suteri" (Fleming, 1948:85).

Type locality - Breaksea Island, Breaksea Sound, Fiordland. Dredged. The above differences between sutherlandi and suteri seem very slight, however, not enough material is available to evaluate the situation further, and the form is geographically far removed from any other members of the suteri group.

Genus: Incisura Hedley, 1904

Type species: Scissurella lyttletonensis Smith, 1894

"A genus of the Fissurellidae, minute, spiral, smooth, with a slit on the right side" (Hedley, 1904:91).

(N.B. - Incisura is now (1976) regarded as a member of the Scissurellidae; however, the distinction between the two families is slight anyway. F.M. Climo 1.5.76)

Incisura lyttletonensis (Smith, 1894)

Commonly collected in shell-grit throughout N.Z.



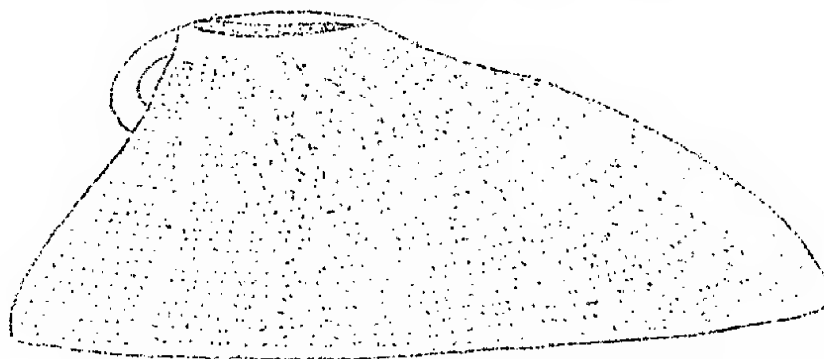
Genus: Vacerrena Iredale, 1958

Syn. Vacerra Iredale, 1924, non Godman, 1900

Type species: Puncturella demissa Hedley, 1904

Minute keyhole limpet-like shell (under 2mm in length), thin and opaque, Protoconch set obliquely and exposing part of 2 whorls. White. Sculpture of fine threads crossed by oblique growth lines. Slit on summit long and thin. Internal septum one third as long as shell, completely screening perforation from interior of shell. Distinguished from Puncturella Lowe by its smoothness, flat apex, long perforation and long septum. These characteristics used to differentiate Vacerrena from Puncturella were the features used by Hedley to distinguish the then only N.Z. species from all other species of Puncturella.

Vacerrena demissa (Hedley, 1904)



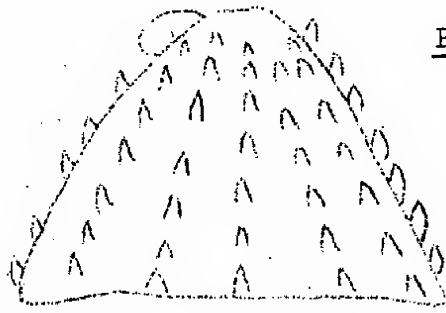
A common minute component of southern dredged shell sand, particularly in Foveaux Strait.

Genus: Puncturella Lowe, 1827

Type species: Patella noachina L.

Differing from Vacerrena Iredale by its more pointed spire, raised sculpture, more keyhole-shaped apical perforation, short septum not completely separating perforation from viscera.

There are 2 species recorded from the N.Z. region: manawatawhia Powell, 1937 a minute (under 2mm) Aupourian species obtainable by dredging; and cf. analoga Martens, 1903 (5mm) from 36 km on the Chatham Rise. P. analoga was recorded from Macquarie Id. That species in those southern regions reaches a length of over 11mm (see discussion on species in Powell, 1957:140041). Powell (1957:141) diagnosed P. pseudanaloga Powell a large Macquarie Id species reaching 11mm in length and differing from analoga chiefly by its delicate sculpture (Powell, 1957: plate 1, figs. 1 & 2).



Puncturella manawatawhia Powell, 1937

Off Three Kings Is.
From Powell 1937, plate 48
figs. 7 & 8.

Puncturella analoga Martens, 1903

Macquarie Island, and Kerguelen.

Puncturella cf. analoga Martens, 1903

Chatham Rise.

Puncturella pseudanaloga Powell, 1957

Macquarie Island.

Genus: Zeidora A. Adams, 1860

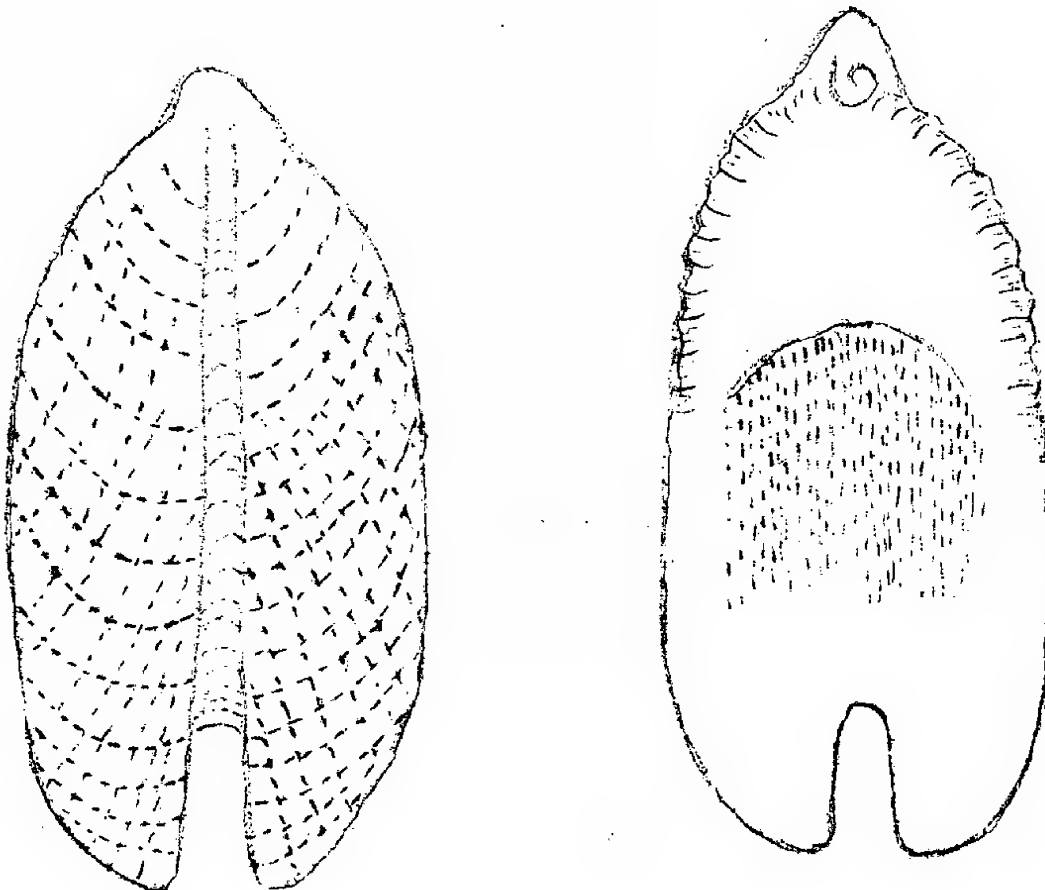
Type species: Zeidora calceolina A. Adams, 1860

A minute shell a few mm in length whose features are best summed up in the following diagrams of N.Z. maoriana Powell, 1937.

Zeidora maoriana Powell, 1937

Dredged off Three Kings.

Fig. from Powell, 1937.



Genus: Scutis Montfort, 1810

Type species: Scutis antipodes Montfort, 1810

The familiar large Shield Shell, diagnosed as follows by Suter (1913:98): "No anterior slit or slit-fasciole; muscle scar near the edge of the shell, its front ends not hooked inward; shell depressed, oblong, truncated or sinuous in front; no radiating sculpture; edge smooth." Shell partially internal in back of large black slug found under low intertidal boulders. Species found throughout N.Z. mainland.

Genus: Emarginula Lamarck, 1801

Type species: Patella fissura L.

The common N.Z. Slit Limpet, defined by Suter (1913:98) as follows: "A slit-fasciole or band in front, distinctly differentiated from the other radiating riblets, extending upward from the open anterior slit".

Emarginula striatula Q. & G., 1834

Found throughout N.Z. region from Northland to Chatham and Bounty Islands. The largest specimens appear to come from the Chatham Islands where they grow to 22mm in length. Intertidal and dredged - dredged specimens tend to be smaller and thinner than littoral specimens.

REFERENCES

- DELL, R. K. 1952 The Molluscan Genus Monodilepas in New Zealand.
Trans. R. Soc. N.Z., 81 (1): 145-51
- 1971 The rediscovery of Montfortula (Mollusca: Fissurellidae) in New Zealand. Rec. Dom. Mus. Wellington, 7 (5): 37-41
- FINLAY, H. J. 1927 A further Commentary on New Zealand Molluscan Systematics.
Trans. N.Z. Inst., 57:344-45
- FLEMING, C.A. 1948 New Species and Genera of Marine Mollusca from the Southland Fiords. Trans. R. Soc. N.Z., 77(1): 85
- HEDLEY, C. 1904 Additions to the Marine Molluscan Fauna of New Zealand.
Rec. Australian Museum, 5:91-93
- IREDALE, T. 1915 A Commentary on Suter's 'Manual of the New Zealand Mollusca'. Trans. N.Z. Inst., 47:433-35
- POWELL, A. W. B. 1937 New Species of Marine Mollusca from New Zealand
Discovery Reports, 15:177-78
- 1939 The Mollusca of Stewart Island. Rec. Auckland Inst. Mus., 2(4):227
- 1955 Mollusca of the Southern Islands of New Zealand.
Cape Expedition Series, Bull. 15:48-50
- 1957 Shells of New Zealand Whitcombe & Tombs, 3rd Ed. & 1962 4th Ed.
- 1957 Mollusca of Kerguelen and Macquarie Islands.
B.A.N.Z. Antarctic Research Expedition 1929- 1931. Reports - Series B (Zoology and Botany), 6(7):140-41
- SUTER, H. 1913 Manual of the New Zealand Mollusca. Govt. Printer, Wellington, and, Atlas of Plates, 1915



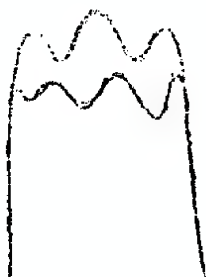
Gadila colubridens

Fig 1



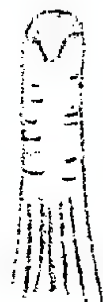
Dischides teliger

Fig 2



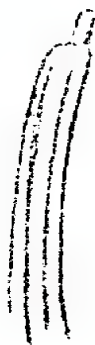
Polyschides delicatulus

Fig 3



Dentalium glaucarena

Fig 4



Antalis suteri

Fig 5

AN OUTLINE CLASSIFICATION OF NEW ZEALAND TROCHIDAE TO SUBFAMILY
CALLIOSTOMATINAE

Wellington Shell Club Study Group 22/LV/1976. F.M. Climo

.....

The following classification was presented:

Family TROCHIDAE

Subfamily TROCHINAE

Genus Trochus

Subgenus Coelotrochus

Thorista

Thoristella

Clanculus

Paraclanculus

MONODONTINAE

Diloma

Diloma (= Zediloma)

Fractarmilla

Cavodiloma

Melagraphia

"Unnamed"

Cantharidus

Cantharidus

Micrelenchus

Plumbelenchus

GIBBULINAE

Gibbula

Cantharidella

Fossarina

Fossarina

MARGARITINAE

Euchelus

Herpetopoma

Margarella

Margarella

CALLIOSTOMATINAE

Calliostoma

Fautor

Maurea

Otukaia (= Alertalex)

Family TROCHIDAE Rafinesque, 1815

The family belongs to a superfamily of shells which are conical to turbiniform with a nacreous inner shell layer. The operculum is multispiral. The peristome is discontinuous in most genera; and the columella and outer lips are not in the same plane. Members of the family are basically vegetarian browsers or grazers on algae or slimes and the great bulk of species are intertidal. There is great merging of shell characters in the family but the most extreme conchological groups have been given subfamily names. The subfamilies and their N.Z. representatives are outlined below.

Unless specifically referred to, the main reference source for these notes has been KNIGHT, J.B. et al, 1960 (Treatise on Invertebrate Paleontology (1) Mollusca (1), Archaeogastropoda: 184-1169).

Subfamily TROCHINAE Rafinesque, 1815

Usually conical shells with base excavated in middle.

Genus Trochus Li, 1758

Conical, base more or less flattened.

Subgenus Coelotrochus Fischer, 1879

Slightly convex whorls; deep false umbilicus

(2 spp.)

Subgenus Thorista Iredale, 1915

Upper surface with spirally arranged nodes: base with smooth spiral ribs.

(2 spp.)

Subgenus Thoristella Iredale, 1915

Small, smooth, periphery rounded-carinate, columella smooth

(4 spp.)

Genus Clanculus Montfort, 1810

Small, rounded conical; columella with tooth; umbilical pit bordered with crenulate ridge.

Subgenus Paraclanculus Finlay, 1927

Flattish whorls

(1 sp.)

Subfamily MONODONTINAE Cossmann, 1916

Littoriform to conical, non-umbilicate (with few exceptions), ornament spiral or smooth. Outer lip strongly prosocline.

Genus Diloma Philippi, 1845

Moderate-low spire; aperture oblique: columella weakly dentate

Subgenus Diloma s.s. (= Zediloma Finlay, 1927)

Nearly smooth; columella with central nacreous area.

(2 spp. type nigerrima (= digna) & arida)

Subgenus Fractarmilla Finlay, 1927

Peristome interrupted by last whorl.

(2 spp.)

Peristome features of Fractarmilla and Diloma

Subgenus Cavodiloma Finlay, 1927

Small, smooth, blunt peripheral keel

(1 sp.)

Subgenus Melagraphia Gray, 1847

Synonym: Anisodiloma Finlay, 1927

Spirally sculptured, strong columellar tooth.

Cernohorsky (1974) has shown that aethipps Gmelin is a synonym of lugubris Gmelin therefore Anisodiloma becomes a synonym of Melagraphia. The single N.Z. species has to be called (Melagraphia) lugubris.

Subgenus "Unnamed"

With nodose spiral ribs.

Trochus bicanaliculatus Dunker, 1844 becomes the next available name for the species previously called lugubris. (Cernohorsky, 1974).

Genus Cantharidus Montfort, 1810

Tapering spire, surface nearly smooth; columellar fold and tooth weak or absent.

Subgenus Cantharidus s.s.

Medium-sized; columella with fold but tooth obscure.

(2 spp.)

Subgenus Micrelenchus Finlay, 1927

Small, spire relatively low, columellar fold not apparent.

(about 8 spp.)

Subgenus Plumbelenchus Finlay, 1927

Columellar fold evanescent.

(1 sp.)

Subfamily GIBBULINAE Stoliczka, 1868

Turbiniform shells with large size variation, usually with an umbilicus; spiral ornament or smooth; peristome interrupted in most genera; outer lip strongly prosocline.

Genus Gibbula Risso, 1826

Sutures impressed: umbilicus bounded by a ridge.

Subgenus Cantharidella Pilsbry, 1889

Small, polished, umbilicus narrow or closed.

(1 sp.

Genus Fossarina Adams & Angas, 1864

Small-minute; spiral sculpture very fine; large body whorl

Subgenus Fossarina s.s.

Aperture entire

(2 spp. one new

Subfamily MARGARITINAE Stoliczka, 1868

Small, thin shells iridescent within; mostly with umbilicus; peristome interrupted; columella and outer lip unthickened in most genera, columella rarely toothed; outer lip not strongly prosocline.

Genus Euchelus Philippi, 1847

Ovate-conical, aperture rounded, outer lip thickened, lirate within; inner lip usually with tooth below.

Subgenus Herpetopoma Pilsbry, 1889

Cancellately sculptured; operculum multispiral

(5 spp.

Genus Margarella Thiele, 1893

Small, thin-shelled, globose, nearly smooth.

Subgenus Margarella s.s.

Rounded periphery; surface smooth.

(7 spp.

Roya Iredale, 1912 is treated in the Treatise as a member of the STOMATELLIDAE.

Subfamily CALLIOSTOMATINAE Thiele, 1924

Conical-turbiniform; mostly large size, no umbilicus or only narrowly so; many with flattened base; aperture quadrangular; discontinuous peristome; no callous on parietal region in most genera; outer lip strongly prosocline; abrupt angle between columellar lip and parietal lip, smooth or with denticle at lower end.

Genus Calliostoma Swainson, 1840

Without umbilicus

Subgenus Fautor Iredale, 1924

Relatively high-spined and small.

(1 sp.

Subgenus Maurea Oliver, 1926 (doubtfully distinct from Calliostoma)

Pointed spire and rounded periphery - based on tigris. The several species are difficult to define because of merging shell features. cunninghami G. & P. is a synonym of selectum Dillwyn, 1817 so the common ocean beach species now becomes Maurea selectum. This was pointed out by Cernohorsky (1974).

Subgenus Otukaia Ikebe, 1942 (- Alertaia: Dell, 1956)

Shiny nacreous shell with spiral keels.

(1 sp.)

(Zetela Finlay, 1927 and Zeminolia Finlay, 1927 are treated by the Treatise in subfamily SOLARIELLINAE Powell, 1951, and will be examined in another study group).

REFERENCE

CERNOHORSKY, W.O. 1974. Type specimens of mollusca in the University Zoological Museum, Copenhagen. Records of the Auckland Institute and Museum, 11: 143-92

THE SUPRASPECIFIC CLASSIFICATION OF THE
NEW ZEALAND RECENT SCAPHAPODA

P. Cresswell

Palmer, 1973, after attempting to apply Emersons 1962 classification of the scaphapod mollusca, encountered systematic difficulties at the supraspecific level which were only resolved by advancing a new classification based on the erection of two Orders, Dentalioida and Siphonodentalioida. From these followed a natural division into four families - two in each Order. Palmer added a further five genera to those recognised by Emerson, bringing to 29 the number of genera with recognition given to 9 sub-genera.

In following Palmer and applying his classification to the New Zealand Recent Scaphapoda, it can be readily seen that while some genera fall conveniently within the criteria cited, others are less obvious, and it seems that further work will be necessary before conclusive placements can be made to all our species. However, a number of changes are proposed. These are listed in the appended checklist.

Class SCAPHOPODA Bronn, 1862

Order SIPHONODENTALIOIDA Palmer, 1973

Family CADULIDAE Grant & Gale, 1931

Genus GADILA Gray, 1847

This genus is characterised by shells which are decidedly curved, swollen near the middle or towards the aperture, and more tapering toward the apex; apex simple.

Gadila(Gadila)colubridens (Watson, 1879)

Removed from Cadulus (str.s.) and placed in Gadila. The criteria for the former genus separating it from Gadila is that the maximum shell diameter is at the median. In fact no New Zealand species are contained within the genus Cadulus.

This species has the shell considerably swollen near the aperture, with the apex very small, rounded and thin; length 15 mm. Recorded from Challenger station 169 in 700 fathoms. See Suter, p.823. - See Fig. 1

Genus DISCHIDES Jeffries, 1867

The genus is characterised by a swollen anterior end and a bifid apex.

Dischides teliger (Finlay, 1926)

Removed from Cadulus (s.l.) and placed in Dischides on the basis of the process on the convex side of the apex, making a bifid notch. Shell up to 5 mm. in length, confined to the continental shelf, down to 160-200 fathoms. - See Fig. 2.

Genus POLYSCHIDES Pilsbry & Sharp, 1898

Characterised by a swollen anterior end and a notched apex.

Polyschides(Polyschides)delicatulus (Suter, 1913)

While Suter describes the apex as being simple and circular (which would suggest(Gadila) Dell (1957 describes six slits on the apex, clearly placing it in this genus; in fact, Dell mentioned possible placement in the (then subgenus Polyschides. - See Fig 3

Order DENTALIOIDA Palmer, 1973

Family DENTALIDAE Gray, 1847

Genus DENTALIUM Linnaeus, 1758

The generic characteristic is symmetrical multiangled ribbing. Shells having a colour pattern are placed in the subgenera Pictodentalium Kira, 1959 and Lentigodentalium Habe, 1963 (respectively multicoloured and with coloured spots on the ribs).

Dentalium glaucarena Dell, 1953

This features rapid tapering, slight curvature and sixteen sharp, evenly-spaced ribs. Shell length 12.5 mm. Chatham Rise and Southeast of Pitt Island, in 200 - 330 fathoms.

This species is somewhat of a problem. Dell suggests that the shell characters are indicative of Antalis, but according to Palmer's criteria for Antalis this is not so. It seems to be a Dentalium, but with a shallow ventrally placed apical notch and smooth apex, which could well require a new genus.- See Fig 4.

Dentalium nanum

No apical slit, and ribbing over entire length of shell, which may be up to 45 mm. long, but averages 20-24 mm. Relatively common from 15 to 160 fathoms, predominantly in Northern and Western N.Z.

Dell (1957) considered its rib count variability. While ribs vary in number from 9 to 13, each population showed a normal distribution curve. Dell argues that Antalis suteri is very close to this species.

Genus PARADENTALIUM Cotton & Godfrey, 1933

6 - angled shell with symmetrical ribbing.

Paradentalium tiwhana (Dell, 1953)

There are six evenly-spaced ribs, and the apex may be smooth. Irregular spiralling of the primary ribs gives the appearance of a straightened out corkscrew. Length 20 mm.

Genus FISSIDENTALIUM Fischer, 1885

The ribbing is asymmetrical, and there is an apical slit.

Fissidentalium zelandicum (Sowerby, 1860)

The riblets are raised and rounded in this shell, and fairly evenly spaced, 16 to 21 riblets per shell. The length averages 50-60 mm., to a maximum of 88 mm. Hauraki Gulf, Chathams, Fiordland.

Genus ANTALIS H. & A. Adams, 1854

The apex of the shell is rounded, and the shell is finely ribbed but only near the apex.

Antalis suteri Emerson, 1954

The ribbing is well marked on the posterior (apex) end, and becomes obsolete over the anterior $\frac{1}{4}$ shell (see Dell, 1957). The apex is rounded, with no slit. The shell is usually about 24 mm. long, but may reach 45 mm.

A fairly constant feature is a subsidiary apical tube; most other shell features are not inconsistent with those of Dentalium nanum. The distribution is predominantly Southern, and its range overlaps that of D. nanum in Fiordland at least; also at the Chathams; it occurs at 18-205 fathoms. This species is probably Antalis but with the pipe attached; however there are some arguments in favour of placing it in Dentalium s.str. with nanum - See Fig.5.

An Antalis ?n.sp. has been found in 138 fathoms off the Three Kings; it has a pipe, and fine ribbing at the posterior end becoming obsolete at the anterior end.

Genus GRAPTACME Pilsbry & Sharp, 1897.

The apex is rounded, and there are striations all over the shell.

Graptacme diarrhoz (Watson, 1879)

The apex is smooth and polished; there is a VERY shallow asymmetrical notch in the convex side. Faint, very slightly raised longitudinal ribs are developed on the body of the shell. Perhaps best described as a Graptacme with a very shallow notch. Occurs at from 220 to 700 fathoms, N.E. of North Island and at the Chatham Rise (archibenthal zone).

Family LAEVIDENTALIDAE Palmer, 1973

Genus LAEVIDENTALIUM Cossmann, 1888

The shell in this genus is smooth, with a rounded apex lacking a slit.

Laevidentalium ecostatum(Kirk, 1880)

The generic placement is somewhat doubtful, as all known specimens lack fully preserved apical features. However, the shell is smooth (apart from concentric growth lines and incipient striations near the anterior end). Palmer diagnoses the family as "lacking in longitudinal sculpture". The type locality is "Waikanae Beach", but since this species has not been sighted in the vicinity since then, this record must be suspect. Later records from a Discovery Station circa 300 fathoms compare well. Shell length 15 mm.

SUMMARY: CHECKLIST OF N.Z. RECENT SCAPHOPODA:

Gadila (Gadila) colubridens (Watson, 1879)
Dischides teliger (Finlay, 1926)
Polyschides (Polyschides) delicatulus (Suter, 1913)
Dentalium glaucarena(Dell, 1953)
Dentalium nanum (Hutton, 1873)
Paradentalium tiwhana (Dell, 1953)
Fissidentalium zelandicum (Sowerby, 1860)
Antalis suteri Emerson, 1954 (± ?n.sp.)
Graptacme diarrhoz (Watson, 1879)
Laevidentalium ecostatum (Kirk, 1880)

Bibliography

- | | | |
|--------------|------|---|
| Dell, R.K. | 1957 | Revision of the Recent Scaphapod Mollusca of New Zealand. <u>Transactions of the Royal Society of New Zealand</u> , 84, pp 561-576. |
| Palmer, C.P. | 1973 | A Supraspecific Classification of the Scaphapod Mollusca, <u>Veliger</u> , Vol. 17, No. 2, pp 115-123. |
| Suter, H. | 1913 | Manual of the New Zealand Mollusca, Wellington, New Zealand. 1120 pp. |

